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Original Communications.

THE TREATMENT OF GLEET, DUE TO PRESENCE OF STRICTURES OF LARGE CALIBRE.

By H. M. Christian, M.D.,
Chief of Genito-Urinary Clinic, University of Pennsylvania, service of Dr. Edward Martin.

STRICTURE of the urethra is considered at the present day by all authorities in genito-urinary surgery to be one of the most frequent causes in the production of gleet. When the stricture is located in the penile urethra, posterior to the corona glandis, gradual dilatation, by the frequent passage of sounds, will, in the vast majority of cases, cure the gleet. In those cases, however, of gleet depending upon the presence of strictures of large calibre at or near the meatus, simple dilatation by sounds is not apt to prove very successful in stopping the discharge.

The unsatisfactory results obtained from dilatation of strictures in this locality depends, in the first place, upon the fact that they belong, for the most part, to that class of stricture known as resilient, or elastic,—a form of stricture which is, as is well known, not amenable to simple dilatation. A second cause for the fail-

ure of dilatation to cure these strictures is to be found in the fact to which Dr. J. W. White has called attention, that, owing to the very abundant nerve-supply of the glans penis, dilatation to anything like the proper calibre gives rise to considerable pain and irritation, sufficient at times to produce a simple urethritis, or marked reflex irritation in the deep urethra.

Another form of stricture in this locality, which often acts as a powerful factor in the production of gleet, is the congenital stricture of the meatus. About twenty per cent. of the cases of gleet treated at the Genito-Urinary Dispensary of the University were found to present a condition of abnormal narrowing of the meatus. Division of the meatus to the proper calibre was invariably followed in a short time by a cessation of the gleety discharge.

In all cases of chronic urethral discharge presenting themselves for treatment at the Dispensary, where the bulbous explorer demonstrates the presence of either of the abovementioned forms of stricture, the practice is to immediately divide the stricture to what is considered the normal calibre. This plan of treatment has almost invariably been followed by a very rapid cure of the gleet.

The books of the Dispensary contain the histories of forty cases of chronic urethritis treated in this manner during the past year and a half, all of which recovered entirely in from two to four weeks after the strictures were divided.

The following is the history of a few of the cases treated, and may be taken as a fair sample of the other cases.

It will be noted that the scale adopted to measure the normal dilatability of the urethra is that proposed by Dr. White, and differs from that employed by Dr. Otis in the fact that it is graded lower, as follows:

A penis, the circumference of which one inch posterior to the corona is three inches, should take normally a twenty-six to a twenty-eight sound (French scale). When it is three and a quarter inches, a twenty-eight to a thirty sound; three and a half inches, thirty-two to thirty-four sound.

CASE I.—R. E., aged nineteen; has had gonorrhœa twice; last attack followed by gleet.

Present Condition.—Meatus glued in morning for past nine months; no history of frequent or imperative urination; clap shreds in first portion of urine passed.

Examination.—C. P. (circumference of penis), 3½ inches; meatus, 18 (F.) calibre.

Treatment.—Meatus divided to 30, followed by daily passage of 30 sound through meatus for four days, then at intervals of three days.

Gleet cured in two weeks.

CASE II.—P. H., aged thirty; two attacks of gonorrhœa; has had gleety discharge in morning for past seven months; clap shreds in urine; no frequent or imperative urination.

Examination.—C. P., 3¼; meatus, 14 calibre.

Treatment.—Meatus cut to 28, followed by passage of 28 sound in the usual method.

Discharged cured in ten days.

CASE III.—H. B., aged twenty-three; gonorrhœa three times; has had gleet for two months; been using injections; complains of morning drop; no discharge through the day.

Examination.—C. P., 3¼; stricture, 22 calibre, one-half inch from meatus.

Treatment.—Stricture divided to 28, followed by passage every four days of 28 and 30 sound.

Discharged cured in two weeks.

CASE IV.—S. G., aged twenty-two; gonorrhœa four times; last attack complicated with epididymitis and posterior urethritis; has had gleet for past four months.

Examination.—C. P., 3¾; stricture, 24 calibre at one-quarter of an inch.

Treatment.—Stricture cut to 32, followed by passage of 32 and 34 sound at regular intervals.

Cured in five weeks.

CASE V.—P. G., aged thirty; has had gonorrhœa three times; contracted last attack one year ago; discharge profuse for one month; had posterior urethritis; has had gleety discharge in morning for past ten months.

Examination.—C. P., 3¾; stricture, 26 calibre at one-half inch; no deep stricture.

Treatment.—Stricture divided to 32, followed by passage of 32 and 34 sound at regular intervals.

Discharge ceased at end of three weeks.

These few cases, taken at random from the records of the Dispensary, may be considered fairly typical, an almost equal amount of success following in all cases in which this line of treatment was pursued. It should be noted that in the examination of all of these cases great care was taken not to consider as strictures either points of physiological narrowing of the urethra or localized patches of granular urethritis.

The mode of procedure is the same in the treatment of all of these named cases of narrowing at or near the meatus. Having ascertained

by means of bulbous bougies the presence of a stricture at or near the meatus,—*i.e.*, within one-half inch of the meatus,—the anterior urethra is irrigated by a warm bichloride of mercury solution (1 to 20,000). The glans penis is next washed with alcohol. A pledget of cotton tightly wrapped on a match-stick and dipped in a ten-per-cent. solution of cocaine is introduced one-half inch within the meatus and allowed to remain for about fifteen minutes. The stricture is then divided on the floor of the urethra to the proper calibre. The instrument used for this purpose is an ordinary blunt-pointed tenotome with convex cutting-edge.

In dividing these strictures the normal calibre of the urethra should be considered as obtained whenever the bulbous explorer, representing in size such calibre, passes the site of the stricture without catching.

The subsequent treatment consists in the passage of proper sounds daily for three days, afterwards at intervals of four to five days.

NOTE ON STRYCHNINE AS A CARDIAC AND RESPIRATORY STIMULANT.

By W. H. Washburn, M.D., Milwaukee, Wis.,
Professor of the Principles and Practice of Medicine, Wisconsin College of Physicians and Surgeons.

During my term of service at the Emergency Hospital this winter a case was brought in which illustrates so well the physiologic effects of strychnine that I deem it of sufficient interest to place the facts on record. At eight o'clock on the evening of December 1 I was hurriedly called to the hospital. On my arrival, a few minutes later, I found the patient, a rather large, robust-appearing man, upon the table in the operating-room, and to all appearances about to breathe his last. His eyes were upturned and the dilated pupils did not react to light; his respirations were exceedingly shallow, irregular, and scarcely perceptible; and he had the weak, uncertain, irregular pulse of a dying man. There was no history at all with the case, the patient having been brought in by the police in this condition. There appeared to me to be but one thing indicated, and that was a powerful cardiac and respiratory stimulant, though there appeared to be not the remotest probability that any good purpose would be thereby accomplished. I accordingly injected subcutaneously $\frac{1}{20}$ grain of strychnine, and then for a few minutes practised artificial respiration. Within a very few minutes there was a most remarkable change in the whole aspect of the case, not only in the appearance of his countenance, but in the character of his pulse and respiration. The respirations soon became so deep, regular, and vigorous that I was enabled to reach the conclusion that the man was suffering from chloroform narcosis, the odor of his breath indicating what he had swallowed. One subsequent injection of $\frac{1}{60}$ grain of strychnine was given about an hour after the first, and at ten o'clock I had the satisfaction of being able to communicate with the patient, who, after a great deal of coaxing and threatening, was induced to confess that he had swallowed two ounces of Squibb's chloroform with suicidal intent. The bottle was afterwards picked up near the place where the patient was found by the police.

The patient was removed to the County Hospital the following day with an acute gastritis. He began vomiting about one hour after the administration of the first hypodermic injection. I believe this case is remarkable for the large amount of the drug swallowed without being followed by a fatal result, this favorable outcome of the case, however, being, as I believe, attributable solely to the antidotal effect of the strychnine.

H. C. Wood, in the eighth edition of his "Therapeutics," speaks of three cases of recovery after the ingestion of large doses of chloroform,—in one case one ounce, in the second case two ounces, and in the third case three ounces. In discussing the treatment of such cases as the above he makes no mention of strychnine, a drug whose physiologic action is such as to render it, as it appears to me, the remedy *par excellence* in this emergency. And if strychnine is thus indicated, and is as efficacious as it appears to have been in this case, where the chloroform has been taken into the body by way of the stomach, why is it not the proper remedy to use when alarming symptoms occur during surgical anæsthesia? I am able to add that in one such case, where the patient did not recover well from the chloroform anæsthesia, but appeared blanched and with an almost imperceptible pulse, rapid improvement followed upon the hypodermic injection of $\frac{1}{20}$ grain of strychnine. Too much importance cannot, in my opinion, be attached to the administration of this drug under these circumstances, and I feel satisfied that when this is more fully realized by the profession in general, some cases, at least, of death on the operating-table from chloroform narcosis may be averted.

803 Grand Avenue.

CHOLECYSTENTEROSTOMY, WITH REMARKS ON INTESTINAL ANASTOMOSIS AND EXHIBITION OF A NEW APPROXIMATION BUTTON.

READ BEFORE THE PHILADELPHIA COUNTY MEDICAL SOCIETY, JANUARY 24, 1894.

BY DAMASO LAINÉ, M.D.

I SHALL first briefly read the report of the following case, and then make a few remarks on intestinal anastomosis:

Mrs. L., aged forty-five, married; one child eleven years of age. In the month of October, 1892, she became suddenly ill with the following symptoms: Intense abdominal pain, paroxysmal in character, vomiting, and constipation. Jaundice appeared on the second day, as well as marked discoloration of the urine and clay-colored stools. This was followed by a severe chill on the sixth day, with a temperature ranging between 104° and 105° F. As the jaundice in this case was of the most marked type, coming on suddenly, with no previous history of emaciation, vomiting, or pain, and as the temperature and chills persisted for several days, I decided to send the woman to the Jefferson Hospital, under the care of Professor Wilson, venturing on the diagnosis of acute obstructive jaundice with Charot's hepatic fever, and in the hope that an early operation, at least of an explorative character, would be performed. She remained in the hospital about nineteen weeks, the chills and jaundice persisting, with progressive emaciation. On consultation with Drs. Keen and Brinton, as I have since learned from Professor Wilson, the question of operation came up on several occasions, but the possibility of malignancy and the woman's weak condition precluded for the time being all operative interference. Eventually her jaundice disappeared. She became apyretic and made a good recovery. She was dismissed from the hospital about the 1st of February, 1893.

Up to the time I saw her again, which was July of last year, she had remained in good health and gained several pounds in weight, but on the vomiting, jaundice, chills, and fever suddenly returning, I decided to perform cholecystostomy at once. This I was able to do, with the assistance of Drs. Stoever and Jefferis, of Chester, and removed a large gall-stone from the distended bladder. The concretion was of unusual size and marked by large facets, indicating at least the possibility of the previous existence of other stones in the bladder or present now in the gall-ducts; but as I could detect no others with my finger through the foramen of Winslow, I came to the conclusion that the obstruction must be due to cicatricial contraction.

We frequently read of the possibility of such an occurrence, but whether this has been clearly demonstrated to have occurred or not I am not at all certain. (Since writing the above I find that Osler mentions that this condition is extremely rare.)

The liver in this case was enlarged and the bladder enormously distended, holding, as well as I could judge, about a pint of clear, thin bile.

The fundus of the bladder was stitched to the abdominal walls by a double row of sutures previous to making the incision into its walls. A long drainage-tube was inserted and the wound closed with silk-worm gut. Whether the fever which accompanies these cases is due to a ferment (Charot's theory) or to the effects of the bacterium coli commune, or is of nervous origin due to local irritation, it certainly disappeared within a few hours after the operation. Large quantities of bile continued to be discharged through the drainage-tube, soaking the bedclothes and necessitating frequent changes in the dressings. The patient was up and out of bed on the twentieth day, and had returned to her usual occupation at the end of the month.

As the stools remained clay-colored and she suffered very much from gaseous distention of the bowels, and the daily discharge of such large quantities of bile became extremely annoying to her, I decided to close the fistulous opening. On the 15th of September I put her under ether again and made a Y-shaped incision over the region of the gall-bladder, across the old cicatrix. On entering the abdominal cavity I pushed upward the greater omentum and drew out a small knuckle of intestine, as close to the duodenum as I could judge, and performed cholecystenterostomy, using the smaller size Murphy button. The fistulous tract running through the abdominal walls I curetted and closed at once with a circular purse-string stitch. The abdominal wound was closed without drainage. The temperature remained about 99½° and 100½° F. for several days, but otherwise she made an uninterrupted recovery. On the twelfth day, after receiving an enema, the button was passed. Since that time she has been in very good health, able to attend to all her duties as a housekeeper, and has gained some fifteen pounds in weight.

One of the most noticeable things observed in connection with the gall-bladder at the time of both operations was the fact that every needle

puncture made into its walls remained patulous, the bile oozing out in large drops, showing conclusively that aspiration of this organ cannot be considered as safe an operation as we are led to believe from the advice of recent text-books. Such a procedure, judging from the above facts, should be considered unsurgical and unjustifiable under any circumstances.

It is hardly within the scope of this article to give more than an imperfect *résumé* of the work which has been done in intestinal anastomosis within the last few years. We must date the most important era in this branch of surgery from the introduction of the Lembert suture in 1825. He was the first surgeon to demonstrate conclusively that intestinal wounds unite by adhesion between the serous surfaces. Others have claimed priority, and during the last decade quite a number of sutures and mechanical means have been devised; but they all depend for their success upon the law formulated by this surgeon, that intestinal wounds must unite by primary adhesions between the serous coats.

Next comes the period of Lister, who taught us that living tissues must be kept aseptic if we expected Nature to perform successfully her reparative work.

With these facts before us, we may safely consider certain primary laws which are applicable to all cases of intestinal anastomosis, and upon the strict observance of which will in a great measure depend our success.

1. Absolute cleanliness.

2. Perfect apposition of the serous surfaces which we wish to unite.

3. Rapidity in the execution of our work.

The primary adhesive non-septic peritonitis occurring within a few hours after an operation, and which is so absolutely essential for the perfect union of all intestinal wounds, will not readily take place if infection of the peritoneal cavity occurs; therefore the strict observance of perfect asepsis is of vital importance to the success of any form of intestinal suture or mechanical device. As Nature intended the abdominal cavity to be a closed one and completely lined by a serous membrane, the ideal, in all operations, should be to leave it as far as practicable under the same conditions. As to speed, that, of course, is a matter which will always depend upon individual operators and the degree of proficiency attained by constant practice. The shortening of the time of an operation by any new instrument or suture, all things being equal, should be a strong argument in favor of its introduction. After all, we may safely assert that there is no branch of surgery which requires such minute attention to details as this one.

It may seem presumptuous on my part to make remarks of this character before such a representative body of surgeons and specialists, but these are the facts which have most forcibly impressed me in my very limited experience in abdominal work. Most cases of post-operative peritonitis do not depend so much on the adversity of fate as on the ignorance or neglect of certain laws. Our failures and not our successes teach the most impressive lessons.

In describing the following sutures I shall freely quote from Senn, who, after all, has done more than any other man in this country towards the advancement of this particular branch of surgery. It will certainly repay the student interested in this line of work to read his article in the *Journal of the American Medical Association*. His remark that the history of intestinal sutures is "replete with stupendous ignorance, clever mechanical ingenuity, and patient experimental research" is but too clearly evident in his exhaustive review of the subject from the time of Celsus to our present day. Therefore I shall only attempt to describe those sutures and mechanical devices conceded by the profession to be of some practical value.

In applying the Lembert suture, one which it is unnecessary for me to explain, it is well to bear in mind the distances at which the stitches should be introduced, not only from each other, but from the margins of the wound. It has been advised by one of our recent text-books that this distance be one-twelfth of an inch, but we should always remember the possibility of cutting off the blood-supply by too close apposition of the stitches, and in this manner retarding the occurrence of that which we wish to take place,—adhesion and vascularization of the parts. Also, the introduction of so many stitches consumes time, without adding materially to the better union of the parts. All needles used in this kind of work should, of course, be round, and the silk of the finest.

Dupuytren's stitch is nothing more than a continuous Lembert suture. Czerny, in 1881, added an extra row to the Lembert suture, which included all the coats except the serous, as the latter includes all except the mucous. By this means he hoped to obtain perfect coaptation of the various layers of the bowel,—a firm union, followed by less cicatricial contraction. The inner suture at the same time would be extraperitoneal, ulcerating in the lumen of the bowel, and not becoming encysted, as does the Lembert. In performing circular enteror-

rhaphy, the mesenteric side should receive the greatest attention, since here most of the perforations take place.

The right-angle continuous suture of H. W. Cushing is one I have used very successfully in my experimental work upon dogs, when there was a tendency for the muscular and submucous coat to tear. Halstead lays great stress upon the importance of including this last-mentioned layer in all sutures. Mansell's operation is so difficult to understand from a mere description, that I have thought it advisable to demonstrate the three different steps of its application by as many specimens.

Among the numerous mechanical appliances I shall only attempt to describe Murphy's button, Ramauge's aluminum rings, the decalcified bone-plates of Senn, with which you are all familiar, and Robson's decalcified bone bobbin.

After a number of experiments made with different substances, Senn found that decalcified bone-plates gave the most satisfactory results. By using these he found that large serous surfaces could be held together, the bones acting as splints, and only a few stitches were required, shortening considerably the time of an operation such as gastroenterostomy, in which so much of it is consumed in suturing.

The openings in the plates are three inches in length, and that in the bowels must be made correspondingly long. This is necessary, in order to overcome as far as possible a certain amount of cicatricial contraction, which takes place, after a time, at the seat of all such operations. The degree of contraction depends upon a variety of causes, the proper correction of which has not thus far been satisfactorily solved. The consequent stenosis at the seat of operation will be in proportion to the amount of the wound left to heal by granulation, and this is a factor which Dr. Murphy claims is greatly minimized by the use of his button, which, by bringing the normal histological elements in close and accurate apposition, allows of the formation of less connective tissue, and consequently less contraction takes place.

To these plates are attached four approximation sutures, two of them armed with needles. When these have been tied, the serous surfaces from the margins of the plates are sewed together with a continued suture. Notwithstanding the large opening obtained by this combination of suture and mechanical support, in a certain number of cases complete closure has taken place. As a substitute for the plates several substances have been introduced,—catgut rings, segmented rubber, rawhide, cartilage, chromized gelatin, plates made from turnips, potatoes, and horses' hoofs. Some surgeons who had previously advised and used various appliances in performing lateral anastomosis have now entirely discarded them, and depend upon a double row of sutures for the union of such wounds.

Robson's decalcified bone bobbin is but a slight improvement on the ancient methods of end-to-end union, in which a cylinder of cardboard or the dried trachea of a goose was introduced into the lumen of the gut and the wound united by an interrupted or continued suture.

Dr. Ramauge's (of Buenos Ayres) aluminum rings operate on the principle of the Murphy button. The ends of the bowel are pressed and held together by the rings, which are operated by a groove and ratchet arrangement. Although they allow of a larger central opening than the button, sloughing must necessarily take place, and it must be slower, from the absence of the elastic pressure between the rings which is present in the Murphy button.

The Murphy button, with which some of you are already familiar, is composed of two hollow, metallic, cup-shaped hemispheres with a stem and central perforation in each one. When clamped together the stems or hollow tubes are telescoped, forming a round, smooth button. In performing an amastomosis the cut ends of the bowel are first stitched with a purse-string suture, which is tied over the stem, the edges of the bowel being tucked in the hollow, cup-shaped depression of the button. When clamped together, which must be done by a certain amount of pressure, the serous coats are brought into perfect apposition. By an extra cup-shaped ring, attached to a spring, a continuous pressure is kept up between the edges of the button. The author claims that by this means a pressure atrophy is produced, and not gangrene of the parts included in the grasp of the instrument. In the course of from eight to fourteen days sloughing takes place and the button passes through the intestinal canal without difficulty. Senn claims that he has known several cases in which the parts approximated by the button were found separated on post-mortem examination. I shall quote *verbatim* what he has to say on this subject:

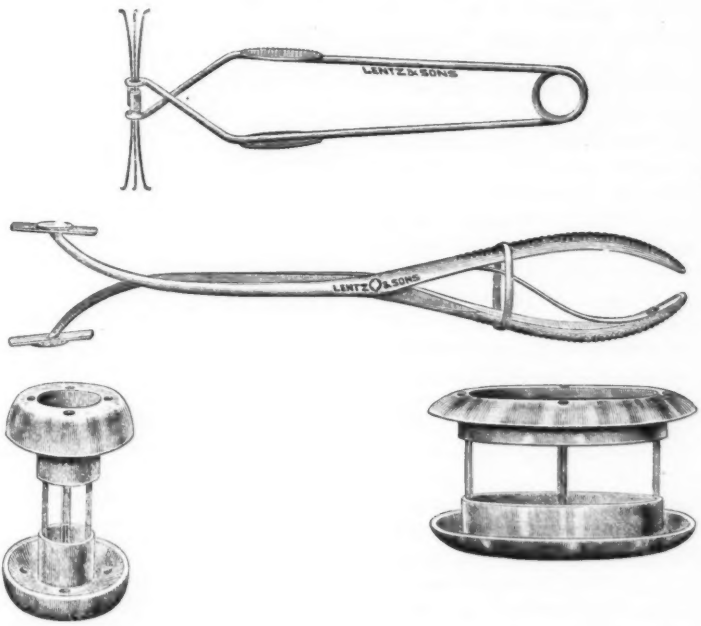
"Any instrument, suture, or ligature used in effecting the continuity of a wounded or divided bowel that produces gangrene must be looked upon as a source of danger. It is impossible to effect an aseptic necrosis in the interior of the bowel, and dead tissue inhabited by pathogenic microbes always constitutes a source

of danger. It is easy enough to produce gangrene, but we are powerless in limiting its extension in this locality. The limited area of living tissue brought in contact outside of the rings of Denan or the Murphy button will not always prove adequate in the protection of the peritoneal cavity against perforation and its immediate result, septic peritonitis. . . . The size of the button is also a very serious objection. I have operated for intestinal obstruction produced by a gall-stone less than an inch in diameter which had become impacted in the lower end of the ileum, and other surgeons will recall similar instances."

Notwithstanding all the adverse criticism made by Professor Senn and other eminent surgeons in this country, the usefulness of this button, or the principle on which it operates, will not be limited alone to cholecystenterostomy, where it is already conceded to be the most practical device for the rapid performance of this difficult operation, but it will also find a field in end-to-end anastomoses, gastrostomies, gastroenterostomies, and the closure of fæcal fistulæ. As I have already remarked, the strongest argument in favor of its introduction should be the fact that such long and tedious operations are rendered easy, quick of execution, and comparatively safe. There is no question that it finds its most useful field in the formation of biliary fistulæ, either external or into the bowel, since, having only fluid contents to pass, no matter what the degree of cicatricial contraction afterwards, it cannot be so great as to interfere with the ultimate object of the operation. Dr. Murphy has already reported seventeen cases of cholecystenterostomy operated on for gall-stones by means of the anastomosis button, with seventeen recoveries, as against a mortality of thirty-five per cent., or eight deaths out of twenty-three cases operated on in one sitting, all by means of suture.

In performing cholecystenterostomy by the aid of this button I shall quote the various steps of the operation as described by the author:

"The button is inserted in the following manner: An incision is made from the edge of the rib two inches to the right of and parallel



to the median line, extending downward three inches. The gall-bladder is drawn into the wound, also the duodenum. The duodenum is cleared of its contents by gentle pressure with the fingers. My short intestinal compression forceps are placed upon the duodenum, to prevent the escape of gas and fluids after the incision is made. A needle with fifteen inches of silk thread is inserted in the duodenum, directly opposite the mesentery and at a point near the head of the pancreas. A stitch is taken through the entire wall of the bowel one-third the length of the incision to be made. The needle is again inserted one-third the length of the incision from its outlet, in a line with the first, and brought out again, embracing the same

amount of tissue as the first. A loop three inches long is held here and the needle is inserted in a similar manner, making two stitches parallel to the first in the reverse direction, and one-eighth of an inch from it, coming out at a point near the original insertion of the needle. This forms a running thread, which, when tightened, draws the incised edge of the bowel within the cup of the button. In the gall-bladder a similar running thread is inserted. An incision is now made in the intestine, in length two-thirds of the diameter of the button used. The button (one part of it) is slipped in, the running string tightened, and the button held with the forceps. An incision of the same length is then made in the gall-bladder and between the rows of sutures. The button (the other part of it) is inserted in a similar manner and the running string tied. The forceps are removed and the button parts are held between the fingers and pressed together. A sufficient degree of pressure must be used to bring the serous surfaces of the gall-bladder and intestine firmly in contact and compress the tissues. The elastic pressure of the spring cup of the button produces a pressure atrophy of the tissues embraced within the cup and leaves an opening as large as the button, the button dropping into the bowel and being passed through the intestines."

The objections made by Senn and others to the Murphy button in gastroenterostomy and lateral anastomosis, as allowing of too small an opening in such operations, led me to devise these instead, which I bring before you to-night.

They operate on the principle of the Murphy button, but can be made of any desired shape or size. The approximating power is furnished by rubber bands. These long, oval plates would leave an opening three inches in length. Rubber bands will remain in contact with the gastric juices for several days without undergoing any material change, and will retain, so far as I have been able to determine, their elasticity.

I show you to-night samples made from ivory, walrus tusks, horn, bone, and hard rubber. If, instead of being hollow and sharp, the edges of the button be cut flat and the bone partly decalcified, they can be used on the principle of the Senn plates, as splints, without requiring sutures to keep the serous coats in contact.

I shall shortly perform a number of gastro-enterostomies on dogs, using these long, oval plates, and report within six months or so the results of the operations and the amount of contraction which has taken place in each case.

MEDIA, PA., January 24, 1894.

A NEW DRESSING FOR CIRCUMCISION.

BY F. GUNDRUM, M.D., ESCONDIDO, CAL.

ALL those members of our profession who have performed the operation of circumcision no doubt have had an experience similar to mine,—viz., that the most troublesome and trying time for both patient and surgeon comes after the operation. From the time of the first dressing until complete cicatrization has taken place—sometimes a period of weeks—there is more or less constant suffering, at least in the majority of cases. Too well do I remember how the little patients dreaded to have their wound dressed. In rarer cases, where there was a non-adherent prepuce, and where the wound healed by first intention, things progressed more favorably. But for those surgeons who believe, as I do, in tearing down the frænum, there is always more or less pain referred to this spot. Under the common dressing it necessarily follows that there must be more or less irritation, inflammation, and pain. Not alone is this due to the wound the surgeon makes, but it arises from the tender glans surface which has been exposed and often largely denuded of its epithelial covering in peeling the adherent prepuce from it.

Even if there have been no adhesions, a few days' exposure to the air, supplemented by irritating dressings, and last, but not least, the almost constant contact of urine, soon destroy the surface epithelium, thus depriving the acutely sensitive nerve-endings of their normal covering.

After removing the skin as far back as the sulcus or cervix of the penis, I make a dorsal incision through the mucous layer of the prepuce and entirely free the head, tearing down the frænum. I now trim off the mucous layer, leaving a sufficient width to turn back like a cuff and to be stitched to the skin.

This stitching is a very important part of the operation. It should be so neatly done that all raw surfaces are coaptated. The best material for suture is fine catgut. If this is not at hand, fine aseptic silk will do. Having completed this part of the operation, the penis should be thoroughly cleansed with some aseptic solution and completely dried. Now, with a camel's-hair brush, the penis is painted from the meatus almost to the root with the following mixture:

℞ Resin, ʒii;
Copal varnish, ʒii;
Beeswax, ℥i;
Tallow, ℥ii;
Iodoform, ʒi. M.

Heat to about 150° to 175° F.; stir, mixing the iodoform thoroughly. Allow to cool to 115° to 120° F., when it will be ready for use. Apply one coat, and allow it to harden; then another and another, until the penis is hermetically sealed, leaving the meatus free. The dressing is completed by wrapping one or two layers of aseptic gauze round the penis and painting with the mixture. The patient should be seen in forty-eight hours. If the bandage is loose, it should be removed. Two or three fresh coatings with the mixture should be applied. Of course the penis should be properly protected by a ring of cotton. The mother is instructed to warm the mixture and apply it with the brush daily until complete cicatrization has taken place. The precaution of testing the heat of the mixture by the finger should always be taken before applying it to the child. When this dressing is used there is no inflammation, no discharge, no swelling, no pain, and no crying and screaming.

Before using this dressing, the most troublesome feature of circumcision in children was the care of the patient after the operation. Now this is all changed. After the first night the patients seldom lose sleep and they eat well. This dressing fulfils all the indications. It is aseptic-antiseptic, and completely excludes air and all germ-life. Moreover, it keeps the urine from the wound and from raw or sensitive surfaces.

THE CASES SUITABLE FOR EXCISION OF THE DRUMHEAD AND OSSICLES.

By B. Alex. Randall, M.A., M.D.,
Professor of Otology in the University of Pennsylvania and the Philadelphia Polyclinic, etc.

THERE is much still very unsatisfactory in the treatment of chronic ear-diseases, limiting at once the certainty, rapidity, and completeness of success, and leaving much too large a proportion of cases in which the usual methods fail of cure, at least within what the patient regards as a reasonable time. This poor showing of Otology is not nearly so common as is often supposed, for the proportion and degree of successes compare favorably with that in most fields of medical practice. But the tradition which sets down the majority of chronic ear-troubles as incurable still prevails even among aurists, and will be long in receiving its merited death-blow. Until it is corrected, this impression, that the usual otological measures are inadequate, is likely to render a considerable part of the public, medical as well as lay, impatient of according any sufficient trial to the well-proved means of treatment, and will lead them to hail with enthusiastic hope any new claims that make a plausible showing.

Especially does this hold true for operative intervention, which is in accord with the spirit of the time and is new enough to the general knowledge to have the charm of novelty undashed by acquaintance with numerous disappointments. Hence there is much inquiry among general practitioners as to the value of such a measure as excision of the drumhead and ossicles, which has been proclaimed as "the modern treatment for suppuration, deafness, and vertigo." The younger aurists are stimulated to make premature and ill-judged experiments with the methods, to overrate their value and safety, and to scorn the conservative attitude of elder aurists as timid and fossilized. But they do so much to bring condemnation upon operative procedures by exaggerating their benefits, overstepping the proper limits in the selection of cases, and bringing occasional disaster upon their patients, that the elders are frequently confirmed in their scepticism, and feel moved to an utter denunciation of the whole field, without at all trying it themselves.

Yet there is surely a middle course, wiser from a scientific point of view, and more just to the patients who confide their present and future welfare to the aurist's care, trusting him to know and employ the best means for their relief. Prejudiced inaction and rash intervention are equally to be condemned; and it behooves us to make our best endeavor to differentiate carefully the cases to which the various methods are properly applicable, and to define, as far as we may, the true field and value of these operative procedures.

The indications for operation will always be variously read by different men. The skillful operator, accustomed to success, hesitates less to attack the doubtful cases than another, properly self-distrustful, does about operating in those in which the need is clear and urgent. He who in long series of cases generally regarded as obstinate or incurable has had fairly full success by non-operative methods looks askance at another who publishes a host of operative results, which suggests that operation alone has been tried. Much of this will continue even after we have secured more uniform and rational nomenclature, made better records, and compiled more reliable statistics of ear-diseases, although great help may be expected from reforms in these directions. Study and diagnosis must be more thorough and exact, pathological teaching must be sought from wider fields, and prognosis must be more con-

scientiously drawn from fuller knowledge of the possibilities of the case in hand.

As a contribution to this subject, it has seemed well to bring forward some observations and thoughts upon the pathological conditions with which the aurist has to deal, especially in chronic suppurative cases, and thus to endeavor to eliminate some errors and to make clearer the indications for operation.

Tympanic inflammation almost always occurs as an extension from the nares by way of the Eustachian tube; and its successful treatment generally entails the removal of the diseased conditions still lurking in the nasal and tubal mucous membrane. Inflation from this side is usually an important diagnostic and therapeutic measure, and it must not be neglected in favor of means employed through the external auditory canal. Drainage to no inconsiderable amount habitually goes on through the tube, as the effete cells of the tympanum melt down into mucus and are swept away; and free passage in this direction must be assured, if we are wholly to terminate discharge outward. This should go without saying; yet in fact it has to my knowledge been frequently overlooked in cases where excision has been advised with no study of the patulency of the Eustachian tube and similar fundamental factors of health.

In the non-suppurative cases of catarrhal deafness there is no criterion by which to clearly recognize those for which excision is advisable. Instances of impaired bone conduction are almost sure to disappoint, and these must be excluded by tests with low- as well as high-pitched forks. Gelle's tests may indicate anchylosis of the stapes and direct any intervention to it rather than to the drumhead and larger ossicles. Urgent demand for relief may be enforced by marked aural vertigo or maddening tinnitus; but this will be very rarely the result of the tympanic catarrh. Serious vertigo of tympanic origin is uncommon even in the cicatricial cases which result from destructive suppuration. So, too, as to the tinnitus; it is often unimproved by excision, not rarely caused or increased by it. In only a small group of patients, impossible to designate beforehand, will the removal of the drum-membrane and larger ossicles give any noteworthy improvement which does not sink to the vanishing-point within a year or two. Schwartze, the pioneer in this field, has operated in rare instances since 1873 without getting any success that he has cared to publish, although regarding excision as "not contra-indicated." Lucae, who had done more than forty excisions in 1881, concluded from his fifty-three cases, with notable gain in nine, slight gain in nineteen, and loss in seven, that operation was too uncertain, and has abandoned it. Dench made a notable gain in six, and slight improvement in four of his ten very carefully selected cases; but total loss of hearing has been reported by Kessel, Schwartze, and Wuerdeman, and few operators of wide experience have escaped results little less disastrous. Tinnitus has often been wholly unrelieved; and some patients, having looked to the operation as a sure last resort, have committed suicide as soon as its failure was apparent. Excision in carefully selected instances of catarrhal deafness may be expected to aid a considerable percentage of cases, but every patient must run a decided risk of failure, perhaps disastrous.

As to tympanic suppuration, accessibility is the prime necessity to its successful treatment. The lack of this when the attic and antrum are fully involved is the cause of the obstinacy of many otorrhœas which defy, perhaps, the most thorough employment of non-operative methods and furnish a real demand for surgical intervention. A high-placed perforation is often cited as constituting a poor means of drainage or of access,—a claim justified only in the cases where there is graver meaning in the location of the opening than has always been recognized. Perforations up and back, close below the posterior fold, frequently indicate caries of the incus-shank or of the adjacent tympanic margin. In like manner, as is better known, the openings in the flaccid membrane of Shrapnell point to foci of suppuration in the circumscribed upper cavities of the tympanum, where drainage is very imperfect, the entrance of medicinal means difficult, and the bone surfaces of the Rivinian margin and the malleus-neck especially liable to ulcerate. Caries, then, is the frequent reason for the intractability of the case, as it is also the reason for the high position of the perforation; and the question of operation, beyond the mere enlargement of narrow openings, hangs largely upon the presence and curability of carious conditions.

Brought about commonly by the retention of decomposing discharges, caries can hardly be combated unless this can be fully removed and reaccumulation prevented. Decayed bony spicules must be dislodged, and the granulations, which are nature's means of effecting the cure, must be destroyed when polypoid, and stimulated to healthy growth as soon as possible. Free access must be gained, and when

the presence of the ossicles proves an insuperable obstacle to this, their removal is clearly indicated. Yet experience has shown that drainage is sometimes no better after such an operation, that the carious surfaces are not upon the malleus and incus, or not there only, and that fuller intervention in the curetting of the walls of the attic, or the removal of the whole *scute*, so as to open the attic fully into the canal, is needful to establish full access. Moreover, there are not a few cases where the major lesion is in the antrum, and no amount of intervention which does not open it freely into the canal or outward upon the mastoid surface can give rational prospect of cure.

It is no reproach to otology to acknowledge that the differentiation of these conditions is rarely possible beforehand, and that here, as in most other fields of surgery, the operation must be exploratory. An operation within the canal will always seem less severe and sweeping than a mastoid trephining or the procedure of Stacke, with its free cutting of the soft parts; just as patients and surgeons are apt to regard any amount of groping after a foreign body within the canal or tympanum which makes no external wound as a less serious matter than turning forward the dissected-up auricle and canal and doing the needful work in plain sight and within easy reach. Yet there will be a reduced mortality as well as other great gains when the latter operation obtains its proper place in aural surgery; and it is probable that the same is true as to excision of the ossicles.

The latter operation seems too easy to those who have not often assayed it, and know it only through the descriptions of its advocates; for there are few operators but have spent an hour or more over some of their first cases, and have failed even then to remove the incus. Perfected instruments and improved technique will lessen but never remove these difficulties, but they are doing much to render the simple excision a safe exploratory step in the cases demanding intervention. In but a portion of the cases proper for its employment will it prove more than this, and the aurist who holds it out as offering more frequent cure will disappoint himself and his patient. That statistics to the disproof of this can be readily cited does not at all controvert this claim, for analysis of the reported operations shows many points in which a strong presumption lies against the asserted showing. The experience of some operators is too small for their few favorable cases to count for much in such a broad question; that of others is suspiciously large. The following of cases to learn the final result has been generally inadequate, the estimate of success sometimes contains too peculiar a personal equation, and the conclusions drawn and urged are at times at clear variance with the recorded facts. Taking the face-value of four hundred reported operations, we find a claimed success of sixty-five per cent., a result which sinks, for Americans and foreigners alike, to near fifty per cent. when the phenomenal and really incredible success of one operator in ninety-three per cent. of his eighty-four cases is left out of the count. Nearly half of the operations in cases selected as suitable for simple excision have thus far failed,—not such a bad showing, could we accept the view that these patients really required the operation, and that the ultimate results were as stated. Yet a glance at the published reports shows that many of these cases were not only lost sight of long before the apparent cure could be accepted as assured, but were also often operated on at once without trial of the less serious measures, which might have proved equal in efficacy.

It has been sagely claimed that if the caries be limited to the ossicles, their removal must end the disease. Experience has strengthened this claim, but it is far from full establishment, since the suppuration, with its imaginary and real dangers, can persist without bone lesion. The counter-claim, that caries can frequently be healed without resort to excision, is as well established by experience. Amputation of the leg is a fairly sure cure for in-growing toe-nail or tibial caries, but the surgeon rarely deems these measures called for, at least until more local means have been tried. It has been urged that the conservative healing of tympanic caries is apparent only; that after excision is real. Time, the only touchstone on which they can be tried, has rarely given a decisive test of the rival claims; and isolated results here and there support each side of the contention. That in dealing with at least two hundred instances of Shrapnell perforation and an equal number of other cases where caries of the ossicles was or seemed to be present I have operated by excision in only fifteen, may mark me as a timid surgeon; and I am free to say that a larger number, perhaps thrice as many, should have had radical measures. Many of these patients received and rejected the advice; many more were lost sight of before it could be fairly decided on. But only one-third of the operated cases were cured, and that only tardily, none too certainly, and apparently as much by other measures as by the excision. Not a single brilliant result has been met. On the other hand, quite one-third of the non-operated

patients were discharged with apparent cure as promptly achieved and often verified by years of subsequent observation. Nor should it be left out of consideration that not a few of these latter patients had already consulted capable men, advocates of excision, and been assured, after treatment or without it, that operation alone gave them any promise of cure.

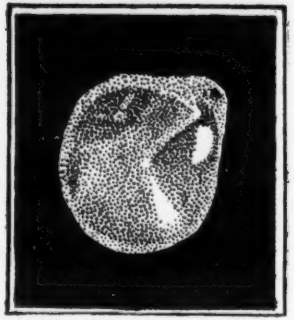
Two recent cases in point may be cited. One had a perforation up and back (Fig. 2), fringed with granulations about bare bone on the tympanic margin and filled by a polyp arising from the incus-shank. The hearing was very poor, and operation was insisted on as the sole resort, although treatment had not been tried for some time, nor by a specialist. Biting off the polyp in studying the case restored the hearing for a faint whisper; rubbing and cauterizing the carious surfaces gave apparent cure in three weeks, with a good movable cicatrix closing the perforation. Slight relapse has occurred, and cure may be only seemingly gained after three months; but it has stood the test of severe coryzas, and the hearing has remained perfect. Another patient was offered excision for her growing catarrhal deafness. I found a flaccid membrane so distended by cholesteatoma as to hide the rest of the drumhead (Fig. 4). I restored the hearing to an excellently useful point by removing the collected material, and in two months secured a covering-in of the bare surfaces on the malleus and Rivinian margin that gives promise of permanency. Both cases are too recent to prove anything as to the ultimate issue, although each has been followed longer than many of the reported cures by excision; each has another important lesson to teach. The first had long since suffered a like lesion on the right side, and for a year past has had entire healing. Through the scar up and back in this membrane (Fig. 1) the stapes can be seen to be almost wholly disconnected from the incus, which seems to have lost its articular tip. Yet this serious lesion has healed, and the hearing is perfect. In the other case the right ear (Fig. 3) presents a puckered scar of the upper back quadrant, largely adherent to the inner wall and barely revealing the stapes which it enfolds. No trace of the incus is visible; its shank at least has been lost. Healing with grave loss of hearing has been present ten or more years; but gentle manipulation with probe and pneumatic speculum has so far mobilized the stapes that a loud whisper can be heard at six feet, and ordinary conversation at ten.

Another case has been under observation three years or more at the Polyclinic. Both ears presented suppuration in the attic, with rough, bare bone and loss in the Rivinian segment, a seemingly carious area on each malleus-neck, and a perforation high up posteriorly with a granulation-covered margin, within which rough bone was felt. On the left side (Fig. 6) healing was secured with fair promptness, which has persisted, after an early relapse, for upward of two years. On the right (Fig. 5) the caries above the short process was more obstinate, and has repeatedly relapsed after apparent cure; it has now been quiescent about a year, and its cessation is growing more assured. The posterior perforation, however, has never closed nor been dry more than four months. I have repeatedly decided to operate, and as often have been led to stay my hand because of immediate improvement. Operation is probably necessary, but I doubt if the patient will consent.

Little idea of the curability of these conditions of caries can be gained from such citation of individual cases; and as to the majority of such patients I can make no report of verification of the cure after years. Some have no recognized trouble; but I impeach subjective evidence as inadequate to prove the reality of cure. Yet that carious conditions can thoroughly heal, testimony as competent as any that can be adduced may be obtained daily in our clinical work. Patients are often seen whose suppurative disease has been so long past as to have escaped or antedated recollection; yet examination shows clearly the ravages of caries above the short process or in the stapes-region. The neck and head of the malleus are exposed or partially destroyed (Fig. 7), or, the incus-shank having been lost, the stapes is freely open to view (Fig. 8). Sometimes the history is fairly clear as to the date and duration of the affection; whether so or not, the cure is indisputably complete, sometimes with perfect preservation of function.

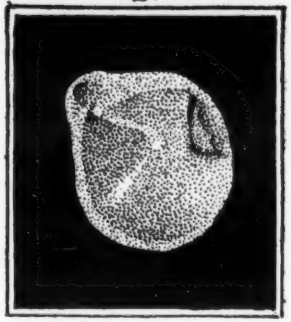
The proof is conclusive that these cases of suppuration with carious lesions are not rarely curable without excision; and the hearing can be perfectly preserved or restored at times if impaired. The question turns, then, upon the safety and rapidity with which the results can be obtained in general and in the individual patients. No sufficient evidence can be as yet adduced on this point. My fifteen cases with no single prompt healing may be regarded as excessively severe tests of the measure; they certainly were not easy cases where other means had not been fairly tried, as the material of other operators has none too rarely been. They

1.



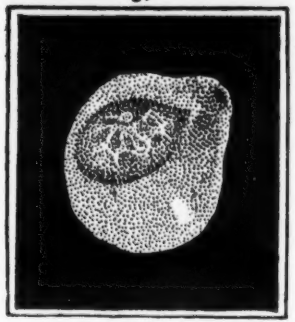
Right drumhead, with retraction and chalk deposit; foramen above the short process and circling backward, revealing the stapes and displaced incus.

2.



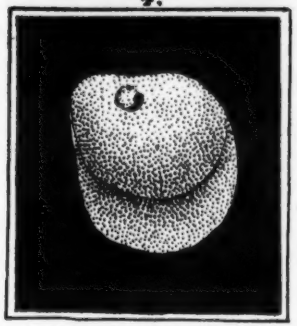
Left drumhead of the same patient, showing perforation up and back, with granular margins and protruding polyp.

3.



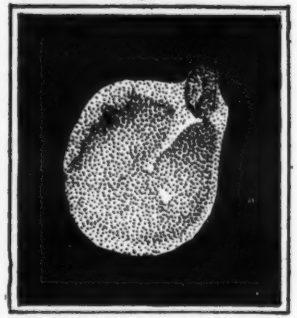
Right drumhead, showing old plicated scar investing the stapes; foramen above the short process.

4.



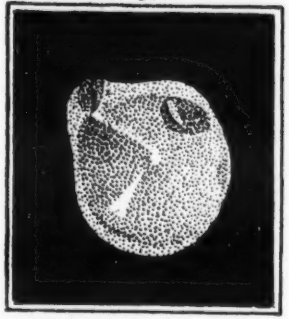
Left drumhead of the same patient, nearly concealed by the distended flaccid membrane from an opening in which the epidermal contents protrude.

5.



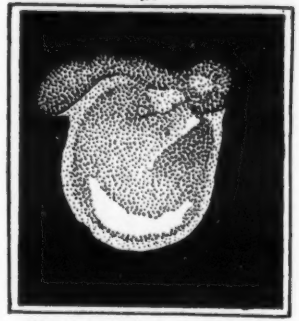
Right drumhead, with loss of the bony margin and uncovering of the malleus above short process; a perforation up and back shows only its prominent margin.

6.



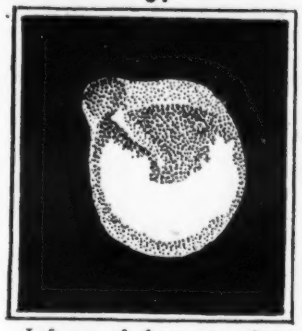
Left drumhead of same patient, healed for two years after suppuration and caries in the Rivinian region and near the stapes.

7.



Right drumhead, showing loss of substance, laying open the attic and antrum and showing remains of the ossicles now healed.

8.



Left ear of the same patient, with more extensive chalk deposit, less loss above the short process, but the stapes uncovered by absence of the incus.

were fair cases for the test, as they gave no evidence of extensive lesions, such as have led me to exclude six or eight other excisions from consideration here. On the other hand, I have no hesitation in impeaching many of the claimed successes as having been obtained in patients on whom the operation was not clearly necessary, or as having been followed too short a time to justify any statement as to definite cure. It has been the reproach of the non-operative methods that relapses occur, and a year of healing may not exclude recurrence. I claim that any one aurist of good experience can, like me, match an observed and verified case of unoperated caries healed for years against every operated one so cited by the advocates of excision. This does not ignore the fact that most of the men who have operated rarely have kept track of their cases, and that Ludwig and Gruenert have followed up the long series of Schwartze's patients.

As to the rapidity of cure, it may be appropriate to note that I have several times operated on one ear when the other was similar, sometimes apparently better, except in hearing, and have obtained a cure only long after the other ear was healed. The prompt cessation of discharge in some of the operative experience of others immediately after the removal of ossicles extensively carious, makes a showing for excision in appropriate cases which no scepticism can undervalue, especially when the gain has proved permanent. Yet milder measures have given as striking cures. Much in this relation must depend upon the skill and thoroughness with which milder measures are applied. Intratympanic syringing must often fail in whole or part when attempted with the clumsy canulas offered and figured. Skilful employment of the probe, with full penetration into the affected regions and removal of polyp-masses, epithelial collections, and pus, is a prime requisite to the study, as well as the treatment, of the patient; and he who cannot or will not do this has no right to ascribe his shortcomings to the method. Only when this has been conscientiously but vainly done for weeks or months is excision generally justifiable; and thus employed, simple excision will often prove as inadequate as I have generally found it.

Finally, as to the safety of excision. Disaster is rare, either from the operation or the anæsthesia. General narcosis is usually needed in the suppurative cases, and its possibilities of evil cannot be wholly ignored. Schwartze expects a loss of hearing in one-twelfth of his patients, which he offsets with gain in one-half. I have never improved the hearing by operation, and I believe its influence largely negative where proper previous treatment has been given. The cases above cited show how the function may be bettered without resort to excision, and much has probably been ascribed to it with no justification. Facial paralysis has befallen some patients; my only case was tubercular, and supervened only a fortnight after operation. It may have been due to instillation of two-per-cent. nitric acid, which has several times been followed by bad results in my experience. The stapes has at times been unintentionally dislodged or removed, with no damage as yet reported. The operation will generally prove harmless, only disappointing; but we must expect occasional disaster.

The cases suitable for excision form a small group, including very few catarrhal cases, and only some of the really obstinate suppurations. Most of the serious purulent affections demand more radical intervention, of which this may form one step.

THE INFLUENCE OF PIPERAZIN ON THE URINE, AND ESPECIALLY ON URIC-ACID AND UREA EXCRETION. UNTOWARD EFFECT OF LARGE DOSES OF THE DRUG.

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In a previous paper on piperazin * the results of a study of the drug on the urine in three cases of nephro-lithiasis was given. It was there remarked that though a cure resulted in two of these cases (of presumable uric-acid calculi) during the course of the piperazin treatment, no coincident noticeable influence was apparent on uric-acid excretion. The two cases cured were from their nature such as seemed insusceptible of relief by other than operative means. Striking amelioration, and subsequent cure, in the first of these cases, one of calculous hydronephrosis, had been too prompt after failure of other tried remedies to leave reasonable doubt as to cause, whatever ambiguity might exist as to the *modus operandi* of the remedy. In the second case, also, one of suppurating kidney, with frequent attacks of renal colic and hæmaturia, of seven years' duration, symptoms finally disappeared after taking piperazin steadily for three months.†

* Therapeutic Gazette, January, 1893.

† These cases, followed to the present, have remained cured. Case I., in which the passage of gravel was of almost daily occurrence, has passed none since. She resorts to piperazin on the occasional reappearance of slight

The third case was probably one of calcium oxalate stone, which, from its composition, had not been thought susceptible of solution by piperazin; in this case no benefit followed its administration.

In these three cases uric-acid excretion was habitually abnormally high, notably in Case II., and the daily fluctuations were often extensive. It was not apparent, however, that excretion of either uric acid or of urea, or even the degree of acidity of the urine, were markedly influenced by the piperazin in the doses administered, the average of which was a half-drachm daily, double that previously used by most observers. Notwithstanding a considerable range in the daily fluctuations of uric acid in the three cases, the average of several days' estimate of amount prior to taking piperazin and while under its influence was practically very similar. It therefore seemed curious to understand the mode of action of piperazin from the stand-point of influence upon uric-acid excretion. As I remarked in the former paper on piperazin, a uric-acid calculus may be of no very small size and yet undergo moderately prompt solution without the fact being detected by quantitative examination of the urine, the light weight of the stone not appreciably affecting the continuous daily variations in excretion. Yet, from the supposed action of piperazin, combining with and forming a soluble salt of uric acid, it was *a priori* supposed that some increase in uric-acid excretion would be apparent. The bulk of the evidence, however, at the time of the appearance of my paper, was, curiously, to the effect that piperazin, though it had, *in vitro*, a markedly disintegrating effect on uric acid, with which it forms the most soluble salt of the latter known, does not actually, in the doses ordinarily advised, increase uratic excretion, however much benefit it seems to exert on cases the nature of which are dependent upon impairment of the latter.

I have myself also obtained at least apparent good results with piperazin in certain other cases of gravel, in one other of suspected renal calculus, —the only other case of stone in the kidney that I have encountered since first using the drug,— and in a case of monarthritic subacute enlargement of the wrist-joint of supposed gouty origin. In the last a decided diminution in the joint swelling occurred under the influence of piperazin, in doses of but 15 grains daily, and pain, which previously had been severe, also promptly disappeared. In several of these cases some increase in the amount of urine under piperazin was noted. These results naturally gave me some confidence in piperazin, and I have been curious to discover its probable mode of operating, and to determine by further experiment if it is in all cases without influence on uric-acid excretion. As the cases before reported in which quantitative uric-acid examinations were made were those with kidneys the function of one or both of which would be somewhat disturbed by the presence of stone, it was important to repeat them in cases other than these, employing it both in moderate and in large doses.

In the following case piperazin was tried in moderate doses for a short time to determine its influence in stimulating inadequate kidneys. The case is one of chronic Bright's disease, in which, with the constant presence of mild uræmic symptoms, albumin remains absent from the urine. The latter, however, contains casts, and there is persistent decided diminution in the excretion of urinary solids, notably urea. Uric acid is excreted in what may be considered normal amount, though it is also presumed to be present in excess in the blood.* In this case, besides many odd examinations, twenty-two daily consecutive examinations of specimens of the twenty-four hour urine were made for the purpose of ascertaining the actual working condition of the kidney over some time. The specific gravity, degree of acidity, amount of uric acid, urea, and chlorides excreted were carefully noted. The patient, himself an analytical chemist, was careful to live very regularly as to diet and exercise during this time. At the middle of the period of this examination piperazin was administered for six consecutive days, in doses of 5 grains four times daily.

In the twenty-two days the daily average amount of urine passed was 1085 cubic centimetres (36 fluidounces). The daily average amount of urea was 18.56 grammes; of uric acid was 0.713 gramme; of chlorides, calculated as chlorine, 4.82 grammes. The approximate daily average amount of total urinary solids was 43 grammes.

The following table, copied from my paper on non-albuminuric Bright's disease, just referred to, gives the consecutive daily amounts of urine, specific gravity, acidity, uric acid, urea, and chlorides before taking and while on piperazin:

loin pains, and always with a successful result as regards disappearance of symptoms. These pains, long prior to the appearance of symptoms of stone, were premonitory of the onset of fits of gravel.

*A history of this case is published in the *American Journal of the Medical Sciences*, December, 1893, in a paper on a non-albuminuric form of Bright's disease.

CASE OF W. B.

Date.	Daily average amount of urine in cubic centimetres.	Specific gravity of mixed 24-hour specimens.	Degree of acidity calculated on 100 cubic centimetres of urine.	Daily elimination of urea in grammes.	Daily elimination of uric acid in grammes.	Daily elimination of chlorine in grammes.	Approximate daily amount of fluid taken.	Remarks.
Jan. 31, 1893.....	1740	1013	7	22.70	.764	Not estimated	Over 4 pints.	Meat diet throughout the 23 days.
Feb. 1, 1893.....	1650	1014	11	18.00	.329	Not estimated.	Over 4 pints.	
Feb. 2, 1893.....	1400	1015	18	20.00	.950	Not estimated.	Over 4 pints.	
Feb. 3, 1893.....	1390	1012	20	19.50	.780	5.60	Over 4 pints.	
Feb. 4, 1893.....	950	1021	20	19.00	.729	4.20	1¾ pints.	
Feb. 5, 1893.....	920	1020	13	18.40	.934	4.00	1¾ pints.	
Feb. 6, 1893.....	770	1020	24	17.75	.569	2.70	1¾ pints.	
Feb. 7, 1893.....	1160	1015	15	21.00	.779	3.50	2¼ pints.	
Feb. 8, 1893.....	1550	1016	...	21.75	.989	6.37	2¼ pints.	Total 2 days' urine mixed and calculated together.
Feb. 9, 1893.....				21.75	.989	6.37	2¼ pints.	
Feb. 11, 1893.....	931	1018	15	18.00	.729	Not estimated.	2¼ pints.	
Feb. 12, 1893.....	1130	1020	20	23.75	.987	4.50	2¼ pints.	
Feb. 13, 1893.....	875	1021	20	17.50	.666	3.50	2¼ pints.	
Feb. 14, 1893.....	700	.....	40	19.00	.600	4.60	1½ pints.	
Feb. 15, 1893.....	850	1021	30	15.00	.459	2.20	1½ pints.	
Feb. 16, 1893.....	1025	1021	25	16.80	.725	6.45	1½ pints.	
Feb. 17, 1893.....	960	1022	22	16.32	.693	3.50	1½ pints.	
Feb. 18, 1893.....	1400	1021	20	19.60	.700	7.10	1½ pints.	
Feb. 19, 1893.....	1025	1021	20	20.00	.725	5.50	1½ pints.	Total 2 days' urine mixed and calculated together.
Feb. 20, 1893.....				20.00	.725	5.50	1½ pints.	
Feb. 21, 1893.....	955	1024	25	20.00	.765	6.35	1½ pints.	
Feb. 22, 1893.....	1000	1021	18	22.00	.924	5.25	1½ pints.	

20 grains of piperazin taken daily from the 11th to the 17th.

During the six days in which piperazin was taken the average amount of urine passed was 1200 cubic centimetres (40 ounces); the average excretion of uric acid was .831 gramme; that of urea was 19.9 grammes; and of chlorine, 4.58 grammes. The approximate average of total urinary solids was 46 grammes (730 grains). During the six days in which piperazin was taken the average amount of urine passed was 915 cubic centimetres (30½ ounces). The average excretion of uric acid was .699 gramme, and that of urea was 18.34 grammes, and chlorine 4.31 grammes. The approximate average amount of total urinary solids was 39⅔ grammes (610 grains). It may be thus seen that actually a slight diminution occurred not only in the amount of urine, but in the most important of the urinary constituents, notably uric acid and urea. The difference is, however, too slight to be explained by any influence exerted by piperazin on the kidney. I have found that in most cases, if any effect at all is obtained from piperazin, at least a slight increase in the amount of urine passed may be expected. In this case the kidneys were probably too inadequate from disease to respond to the stimulating effect of piperazin. Though placed under the most favorable conditions, the patient recently reports that the amount of urine habitually passed has diminished to 500 cubic centimetres, with a corresponding increase in the symptoms of chronic uræmic intoxication.

Hitherto no observations as to the effect of large doses of piperazin on the urine, such as a drachm or more daily, have been published. Whether such doses could be borne without injury and better results obtained by them, seemed a point well worth determining. It had seemed to me that only in such amounts could benefit be expected, if any was to be obtained, in cases of chronic multiple arthritic enlargement of presumable uratic origin. This is, of course, on the supposition that piperazin has some influence in promoting the solution and excretion of retained insoluble urates. In the following case the indications are that the chronic arthritis is of gouty origin and due to the deposit of urates in the joints through imperfect excretion on account of inadequate kidneys. It therefore seemed a particularly appropriate case for determining the effects of large doses of piperazin.

The patient is Mrs. J. K. M., aged fifty-two; weight, one hundred and fifty pounds. She came under observation in May, 1892, having been

kindly referred to me by Professor Keen for treatment. The joint-trouble began about a year before. The left knee then became swollen, and in the following October the right knee. She had never at any time previously had even a slight attack of rheumatism, nor had there been an outbreak of acute gout. There is no family history of gout or rheumatism. When first seen the knees were only slightly swollen, the left more especially so, and towards the inner surface. Much pain was felt in the joints, especially on movement. There was, besides, a steady, slighter pain always present. A distinct creaking was produced about the patella in extending and flexing the knees. Several of the interphalangeal joints of both hands were at times very painful. Two or three of these showed a tendency to slight nodular enlargement, and there was a nodular swelling on the dorsal surface of the left hand. There was no tendency towards spindling of the enlarged joints, when present so characteristic of rheumatoid arthritis. In addition to the pains felt on locomotion and the slight, steady pain in the knees, attacks of pain, at times quite severe, occurred. These were felt about the knees, in the nucha, and in the finger-joints, and at times were often shooting in character. These always corresponded in onset with a diminution in the excretion of uric acid, as is narrated below. The patient still menstruated, was well nourished, and though there was total gastric anacidity (which still exists), she complained but little of symptoms of indigestion. When she first came under observation the stools were pipe-clay colored, but subsequently, under lavage, they gradually resumed their natural hue. The arterial tension is habitually raised, the sphygmogram always showing the elevated, rounded tidal wave of increased blood-pressure, with the chief descending wave higher than normal, the tracing of raised blood-pressure characteristic, when associated with certain other symptoms, of granular kidneys. There is no discernible arterial thickening nor cardiac hypertrophy. The first sound is, however, very distinct and the second accentuated at the apex. The last is normally placed.

While the patient was under Dr. Keen's care she had taken 15 grains of piperazin daily for seven weeks. This was before I saw her. This had been absolutely without effect upon the joint-trouble, though the amount of urine was quite markedly increased by it. The daily amount of urine prior to resorting to piperazin had averaged but 900 to 1015 cubic centimetres. Under the daily doses of 15 grains it ran between 1200 to 1800 cubic centimetres. From May, 1892, to the present I have made frequent examinations of the urine, the daily output being often measured for several consecutive months, with not infrequently consecutive daily estimations of uric acid and of urea for several weeks running. Thus a very good idea has been obtained of the usual urinary condition, uninfluenced by drugs, as well as of the effects of certain medicaments upon the kidney. The average daily amount of urine passed during the first five months, at intervals when no drugs were taken, was, as is stated above, with an average specific gravity of 1010. Recently, though the volume is subject often to wide variations, the amount, uninfluenced by drugs, tends to be somewhat excessive, and of very pale color and low gravity, resembling the urine of a case of fibroid kidney, the probable renal condition present. Urea is habitually low, averaging 18 grammes (270 grains) daily. The amount for her weight should be in the vicinity of 30 grammes, on average diet. When no acute attacks of pain about the joints occur, the average daily uric-acid excretion is 0.5 gramme. The acute joint pain is usually characterized by a diminution in excretion, the amount often falling to 0.1 gramme or below, indicating at such times impaired solubility of the quadriurates in the blood, with a tendency to their deposition, as sodium biurate, about the cartilages and synovial tissues of the joints.

In this patient two forms of piperazin were tried. My former paper on piperazin was based on the use of the Schering product only, and all remarks heretofore made concerning piperazin in the cases cited apply solely to it. Recently another preparation of basic piperazin has been put upon the market,—that of Bayer's. A sample of this was placed in my hands for trial. I used this upon the patient under consideration, administering it in very full doses,—larger than have been before tried,—to determine the effect of these upon uratic excretion, and upon the joint swelling and pain. Because of the cost of Schering's piperazin I had not then been able to try it in very large doses. Later, however, Messrs. Lehn and Fink kindly placed a supply in my hands for comparison of effects with the piperazin of Bayer. It will be seen, as narrated later, that the untoward effects resulting with the very large doses used occurred with the Bayer product, which had been employed in the two cases. These untoward effects were noticeable only to a slight extent with the piperazin of Schering, used in the one case in about the same dose.

As the accompanying table demonstrates,

CASE OF MRS. J. K. M.

Date.	Amount in cubic centimetres.	Amount in fluidrachms.	Color.	Specific gravity.	Degree of acidity calculated on 100 cubic centimetres.	Urea in grammes.	Uric acid in grammes.	Chlorides calculated as chlorine in grammes.	Remarks.
April 5, 1893....	660	22	Yellow.	1020	20	14.50	0.230	2.50	The amount of fluid taken lay between 2 and 3 pints daily throughout the period in which these urine examinations were made.
April 6, 1893 ...	1380	46	Light yellow.	1018	25	25.00	1.000	6.00	
April 7, 1893....	1800	60	Very pale yellow.	1010	15	18.00	0.100	6.33	Joint pains severe.
April 8, 1893....	1980	66	Very pale yellow.	1009	6	19.80	0.134	6.00	Joint pains severe; 15 grains of Bayer's piperazin taken.
April 9, 1893....	1500	50	Very pale yellow.	1012	10	18.00	0.168	4.00	Joint pains less; 25 grains of Bayer's piperazin taken.
April 10, 1893....	1800	60	Very pale yellow.	1010	11	18.00	0.181	4.75	25 grains of Bayer's piperazin taken.
April 11, 1893....	1860	62	Very pale yellow.	1008	20	18.60	0.840	4.00	25 grains of Bayer's piperazin taken.
April 12, 1893....	1860	62	Very pale yellow.	1012	20	22.12	0.500	3.00	On the 12th 70 grains of Bayer's piperazin taken; untoward effects appeared towards end of day, after third dose; piperazin then discontinued.
April 13, 1893....	1080	36	Yellow.	1014	33	14.50	0.650	3.00	
April 14, 1893....	900	30	Reddish yellow.	1016	30	18.00	0.570	2.00	
April 15, 1893....	1560	52	Pale yellow.	1011	25	18.75	0.524	2.75	
April 16, 1893....	1260	42	Reddish yellow.	1011	25	17.64	0.620	2.50	
April 17, 1893....	1140	38	Yellow.	1012	Not estimated.	16.00	0.700	2.75	
April 18, 1893....	1260	42	Yellow.	1012	Not estimated.	26.16	0.560	Not estimated.	
April 19, 1893....	960	32	Reddish yellow.	1014	22	17.30	0.520	Not estimated.	
April 21, 1893....	960	32	Reddish yellow.	1012	Not estimated.	13.44	0.410	2.00	
April 22, 1893....	1080	36	Reddish yellow.	1020	25	21.60	0.670	6.00	
April 23, 1893....	780	26	Reddish yellow.	1021	Not estimated.	18.00	Not estimated.	2.00	
April 24, 1893....	1680	56	Light yellow.	1011	Not estimated.	20.25	0.386	3.00	Schering's piperazin begun; 20 grains taken.
April 25, 1893....	1860	62	Light yellow.	1010	20	22.60	0.369	5.00	Schering's piperazin; 40 grains taken.
April 26, 1893....	2040	68	Very pale.	1010	15	20.40	0.249	5.00	Schering's piperazin; 1 drachm taken.
April 27, 1893....	1980	66	Very pale.	1011	20	16.00	0.268	5.50	Schering's piperazin; 70 grains taken.
April 28, 1893....	1920	64	Very pale.	1010	10	17.25	0.322	6.75	Schering's piperazin; 70 grains taken.
April 29, 1893....	2040	68	Very pale.	1010	18	Not estimated.	Not estimated.	Not estimated.	Schering's piperazin; 70 grains taken.
April 30, 1893....	1800	60	Very pale.	1011	10	18.00	0.210	6.00	Schering's piperazin; 70 grains taken; slight untoward effects.
May 1, 1893....	1860	62	Very pale.	1012	Not estimated.	23.23	0.300	6.00	Untoward effects disappeared; 25 grains of Schering's piperazin taken.
May 2, 1893....	1800	60	Very pale.	1012	Not estimated.	23.00	0.200	6.00	" " " " "
May 3, 1893....	1800	60	Very pale.	1012	Not estimated.	21.60	0.300	6.50	70 " " " "
May 4, 1893....	1860	62	Very pale.	1011	Not estimated.	22.00	0.400	6.00	" " " " "
May 5, 1893....	2460	82	Very pale.	1008	Not estimated.	24.60	0.160	Not estimated.	" " " " "
May 6, 1893....	1380	46	Reddish yellow.	1015	15	16.50	0.530	Not estimated.	25 " " " "
May 7, 1893....	1040	34	Reddish yellow.	1013	Not estimated.	16.64	0.070	Not estimated.	Severe joint pains; piperazin discontinued, but resumed again on May 14, in doses of 15 to 20 grains daily, and continued until June 7. No further untoward effect.
May 8, 1893....	1500	50	Reddish yellow.	1011	Not estimated.	Not estimated.	0.400	Not estimated.	
May 9, 1893....	1500	50	Reddish yellow.	1011	Not estimated.	Not estimated.	Not estimated.	Not estimated.	

both preparations of piperazin were practically without other observable effect upon the urine than that they increased the quantity of that fluid. No influence whatever was apparent upon the constituent which it had been hoped most to reach. In this case observations prior to those tabulated, as has been stated, showed an average uric-acid excretion of 0.5 gramme, which latter figure, however, was often subject to considerable variation, depending largely upon the condition of the joints, whether subject to severe pain or not. A marked increase would often follow a decided diminution or the converse, as is apparent from the table, under dates of April 5, 6, and 7, and, again, on the 10th and 11th. No steady, detectable increase occurred as a result of steady, large doses of piperazin, such as 70 grains daily. Urea excretion, and that of chlorine also, remained unaltered, as had been anticipated, for no claims have been advanced as to any effect upon another constituent of the urine than uric acid. In this case piperazin invariably exerted a marked diuretic influence. When piperazin was rebegun, on May 14, the urine promptly rose from 1080 cubic centimetres to over 2000 cubic centimetres, and this increase was well maintained while piperazin was continued, as is usual. This increase in urinary water, apart from effect upon its contained ingredients, I have found is a common result of the use of the drug, although it is not noticeable in all cases. The urine in the case under consideration, as in that of all who take piperazin, underwent decomposition very early after voiding, soon becoming of an exceedingly fetid odor. Though its degree of acidity was lessened, an alkaline action was never apparent. Joint pains diminished considerably on the piperazin treatment, but subsequently returned almost as pronouncedly as before. No noticeable effect was apparent on the joint swelling from the use of piperazin.

[Since writing the above I have again used piperazin in this case, and with better results than before. On this occasion it was prescribed in combination with potassium citrate, which alone, in similar doses, had previously had no effect upon the symptoms. It had occurred to me that the contradictory results obtained with piperazin, and the lack of marked benefit in the case just recorded, might be explained by some difference in the degree of alkalinity of the blood in those taking the drug. In the gouty, with a tendency to joint implication, as in the case of J. K. M., the alkalinity of the blood and tissues is usually diminished. As a result it would appear, on consideration, practically impossible for a soluble salt of piperazin and uric acid to be formed from the urate deposited in the joints or with that in the blood, or, if formed, for this salt to effect a passage through the blood into the urine, unless an alkali were coincidently administered. With this idea in mind, a half-drachm of potassium citrate was given with each dose of piperazin. On this occasion piperazin chloride, made by Bayer, and furnished me by Messrs. Schieffelin, of New York, for experimentation, was used. Doses of 15 grains of this salt were administered four times daily for four days, and then 5-grain doses four times daily for six days. The large doses at first tried were used to note if any untoward effect could be produced by them. The result, as regards toxic action, was entirely negative. As regards influence on the symptoms, joint pains, which had been severe prior to taking the combination, ceased on the second day, and remained absent, with marked diminution in size of the affected joints at the end of ten days. There was no recurrence of pain until about two months later; then exposure in a rainstorm provoked a return of pains, which were again checked by the potash and piperazin. On this occasion Schering's piperazin, in doses of 5 grains, were used, instead of the piperazin chloride of Bayer,—the supply of the latter having become exhausted. The fact that potash alone, when used on a former occasion, was without any such effect upon the joint pain and swelling, indicates, in view of the lack of marked result with piperazin alone, that some virtue exists in this combination, and that the explanation lies in the direction just indicated. Of course, it may be that the symptoms might be benefited on one occasion by the potash, and on another not, though that seems unlikely. As the paper goes to press, a second trial in this case of, first, potasium citrate alone, and, again, potasium citrate, in the same dose, in combination with piperazin, gave results identical with the above. But little improvement occurred with the potash alone in joint pain and swelling, which had returned. Decided reduction in these symptoms were once more noticeable after taking the combination.]

The effects of piperazin in this case, in the doses used,—much larger than those hitherto resorted to,—taken in connection with the result of urine examinations by myself and by other observers, in many other cases in which piperazin has been administered, show quite conclusively that the drug is practically without effect upon uric-acid excretion, at least *uric acid as uric acid*. As a result, I confess I am at a loss to understand its mode of action, and were not my clinical results in most of the few cases in which I have used piperazin, other than in the case just recorded, as favorable as those of laboratory investigation were unpromising, I should certainly, on *a priori* grounds, unhesitatingly condemn the remedy as useless. As it is, I shall still employ it discriminately, at least so long as I obtain the desired effects, and that irrespective of mode of action. As regards the latter, I shall not look for a uric acid increase by its use.

There seems little doubt as to the admirable clinical results obtained in certain cases dependent upon the uric-acid condition, accounts of which, from trustworthy observers, have appeared frequently in Germany, though its

action is so obscure. Very recently a report of some experiments of Biesenthal tend to confirm further the good opinion reached based upon clinical data. Biesenthal induced artificially the deposit of uric acid and acid urates in the joints and tissues of doves by the well-known method of Ebstein,—that of gradual destruction of the renal-secreting structure by subcutaneous injections of neutral potassium chromate. To a large number of pigeons thus experimented upon, piperazin was coincidently administered, with the object of noting if this drug would prevent the formation of these deposits. The results obtained were most interesting. In a very large percentage of the doves which received piperazin, it is stated that none of the characteristic deposits of urates occurred, indicating that piperazin actually possesses the power which test-tube experiments attribute to it.*

So far as I can see, since piperazin does not increase uric-acid excretion, and apparently does exert a salutary effect upon the uric-acid condition, the only mode of action possible is that such as has been attributed to certain of the alkalies, such as vegetable acid salts of potash. The increased alkalinity of the blood these latter produce is supposed to promote its oxidation function, increasing the formation of urea, and, perhaps, also, transforming a modicum of the uric acid by oxidation into the former, or into a second more oxidized product than uric acid, such as bodies of the alloxan or allantoin series. Though no data is at hand showing that a transformation of uric acid into urea occurs in the organism, the fact that uric acid is so closely related to the latter, each molecule containing as it does the residue of two molecules of urea, and that uric acid may be so readily made to yield urea as a product of its oxidational decomposition; and, moreover, that when uric acid is administered by the mouth to mammals, considerable of it appears in the urine as urea, tends to indicate that such a metamorphosis may occur in the human organism under favorable conditions. An investigation of the action of piperazin from this stand-point may throw light upon its action, otherwise so obscure. The urea formed from a portion of the uric acid would, of course, be in such small quantity as to be practically unrecognized by quantitative tests; because of the normal daily variation, a gramme or so increase would be susceptible of a varied explanation. The detection of the presence of allantoin or alloxan in any quantity in the urine under the use of piperazin could be more easily interpreted.

Untoward Effects of Piperazin.—To determine if piperazin could be given in large doses without toxic effects occurring, and also to note the influence of these doses upon uric-acid excretion, I administered both the Schering and the Bayer product in the amounts cited in the table in the case of Mrs. J. K. M. A marked difference was noted in the relative toxic effects of the two, but none in the action on uric-acid excretion, both being equally inactive in this direction.

Piperazin Bayer had been taken for five days; the first day 15 grains, the second, third, and fourth day 25 grains, and the fifth day 70 grains, when toxic symptoms ensued. These appeared after the third dose of 23 grains on the day on which 70 grains were taken. A feeling of nervousness and apprehension was first noticed early in the day, but was disregarded by the patient and the remedy continued. Shortly after the third dose of 23 grains on the day on which the 70 grains were taken, intermittent, clonic spasms of the upper extremities appeared, spreading to the muscles of the abdomen and legs, but manifest to a less degree there. The patient became dazed, was unable to think clearly, and seemed for some hours partly unconscious. This condition continued for about three hours, in the latter part of the time to a less degree. Associated with it there was muscular prostration with inco-ordination. The tremors were coarse, and became more intermittent and slighter, until they totally disappeared about thirty hours after their onset. Considerable uncertainty as to gait continued for several days, and seemed rather due to impairment of co-ordination than to any paretic condition of the muscles.

Much slighter untoward effects occurred from the piperazin of Schering in the same dose, and then only after it had been taken for a much longer period. Slight tremor in the hands and arms, with malaise and nausea, occurred on the seventh day. She had then taken 20 grains on the first day, 40 on the

* It may not be improbable that a difference in the degree of akalinity of the blood in birds and in man will be found to account for the striking results obtained with piperazin in these experiments,—results not accruing from its use in many cases in man. As is well known, birds and serpents excrete their nitrogen, not as urea but as uric acid. The akalinity of the blood of the herbivora is greater than in man, but I am unaware of any observations as to this point made on the blood of birds. It seems likely, however, that a similar condition must obtain with the latter, in order that the passage of uric acid through the blood and its free excretion by the kidney may be readily accomplished.

second, 60 on the third, and 70 each on the fourth, fifth, sixth, and seventh days, as indicated in the table preceding. Piperazin was then discontinued, and the toxic symptoms disappeared. On the following day (the eighth) 25 grains additional of Schering's were taken; this dose was repeated on the ninth, and then 70 grains each were taken on the tenth and eleventh days, and 25 grains on the twelfth. The supply of piperazin then became exhausted. No recurrence of toxic effects was noted after the seventh day.

More marked toxic symptoms occurred in the following case under excessive doses of the basic piperazin of Bayer:

The case is that of J. MacK., aged fifty, a case in which there is an undoubted blending of both rheumatoid and rheumatic arthritis. The joints of the fingers, toes, wrists, shoulders, ankles, and knees were affected. The patient was somewhat cachectic. There was total gastric anacidity. The bowels were constipated; the appetite poor. Urine for four days preceding taking the piperazin ran: 870 cubic centimeters, 1000 cubic centimetres, 1260 cubic centimetres, and 900 cubic centimetres; specific gravity, 1021, 1025, 1021, 1025; urea, 14 grammes, 23 grammes, 16.34 grammes, and 20.20 grammes; uric acid, 0.36 gramme, 0.537 gramme, 0.574 gramme, and 0.544 gramme. During the two days in which piperazin was taken the figures were as follows: Amount, 885 cubic centimeters and 1200 cubic centimetres; specific gravity, 1028 and 1015; urea, 30 grammes and 20 grammes; uric acid, 0.620 and 0.645 gramme. Albumin was absent. 30 grains of piperazin were given the first day, and 70 grains the second, the patient being cautioned to discontinue the remedy on the appearance of any unpleasant symptoms, such as had occurred in the preceding case. He was an ignorant fellow, a dispensary case, and failed altogether to heed my admonitions. Notwithstanding the appearance of tremors, with muscular weakness and inco-ordination, at the end of the second day, after the third dose on that day of 23 grains, he took a similar-sized dose the following morning, though the tremors and jerking of the limbs had continued through the night, and he had been delirious and sleepless. Potassium bromide was prescribed in full doses, and would probably have controlled the nervous symptoms had not the attendants, in their ignorance and through their anxiety to relieve him, administered to him 2 to 3 ounces of whiskey through the day. He was already debilitated, had been on very low diet through poverty, and was naturally, I was told, very susceptible to alcoholic stimulants. This probably accounted for the further conduct of the case. Towards night, the jerking in the limbs continuing, he had hallucinations, and became violent and abusive. The following day tremors and prostration had largely disappeared, but his mind was completely unbalanced. He wandered about aimlessly, and was violent if restraint was attempted. He had hallucinations and delusions, and was uncontrollable to such an extent that his people asked to have him committed to the insane department of the Philadelphia Hospital. After a detention there of a few days he returned to his normal condition.

The difference in the toxic dose of these two preparations of the basic piperazin is considerable. This, it may be supposed, is due to one of two reasons: either to greater concentration of drug in the one case,—*i.e.*, less water of crystallization, the drug, however pure, being toxic in large dose,—or to the presence in the more toxic preparation of certain bi-products occurring in manufacture, these and not piperazin producing the effects noted. If the latter is the case, these exist in greater quantity in the piperazin of Bayer than in that of Schering. It is noteworthy that the piperazin of Schering also caused toxic symptoms, but only after it had been taken a much longer time and in greater amount. These symptoms, too, when occurring, were much less in degree and in duration than the untoward effects produced by the other basic preparation of the drug. Still, they did occur, and this indicates that the same toxic principle exists in both piperazins, though not to the same extent in equal amounts of the two drugs.

It is proper to state in conclusion that, communicating with the Farbenfabriken von Bayer u. Co. as to the cause of the difference in toxic effects of similar excessive doses of the two piperazins, I was informed that it was due to their piperazin being more concentrated,—that is, containing less water of crystallization than the other piperazin.

That there may be truth in this is shown by a recent statement of Wittzack (*Munch. Med. Woch.*, 28, 1893, quoted in the *Brit. Med. Journ.*, July 29, 1893), who, in remarking that the hygroscopic property of piperazin must be borne in mind, lest disappointment attend its use, states that some samples of piperazin were found to contain as much as fifty per cent. of water. For this reason he recommends salts of piperazin, rather than the base, as the more stable.

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Leading Articles.

GUAIACOL AS AN ANTIPYRETIC.

GUAIACOL has been used, as is well known, as a substitute for creosote in a large number of cases of pulmonary disease where that drug was indicated, and, so far as we know, has given so much satisfaction that it bids fair to supplant creosote in the treatment of many of these affections. Within the last few months the profession has begun to recognize the fact that it possesses other powers than those of an expectorant and antiseptic, or stimulant of the mucous membrane, and a number of prominent physicians have employed it for the reduction of high temperature.

Two of the most notable contributions which have been made upon this subject—the clinical lecture of J. M. Da Costa and the interesting paper of Robilliard—are particularly worthy of note. In both instances these clinicians used the drug externally upon the skin of the thigh, abdomen, or chest, either by means of rubbing or by painting it on with a camel's-hair brush. After it was applied to the skin it was thought advisable in some cases to place an impermeable dressing over it in order to prevent evaporation. As a result of the application of 20 to 50 minims of guaiacol in this manner, it has been found that the temperature of malarial fever, typhoid fever, and pneumonia rapidly falls as much as seven degrees in the course of an hour or two. Da Costa asserts that this rapid reduction of temperature is not accompanied by any marked disturbance of the nervous system or any evidences of collapse, not even by a very profuse sweat, neither does there appear to be a very active chill, although sometimes slight chilliness is experienced. The drug does not seem capable of holding the temperature down for any length of time, but it has been found perfectly safe to employ it as often in the twenty-four hours as is necessary to prevent pyrexia appearing with severity. Da Costa suggests that in many instances it may take the place of the cold bath, so far as the reduction of the fever is concerned; but whether or not guaiacol, on further use, proves to be a valuable antipyretic, we are sure that the therapeutic results obtained by the cold bath cannot be substituted by this means of treatment, since the cold bath undoubtedly exercises a therapeutic effect over and above that produced by guaiacol. We do not wish to be understood as stating that Dr. Da Costa believes that the cold bath should not be retained. He simply suggests that guaiacol be employed in its place when, because of the lack of attendants, the bath treatment cannot be well carried out, and because he believes that guaiacol is preferable to the antipyretics derived from coal-tar in the reduction of temperature. In the treatment of hectic fever of tuberculosis, J. Solis Cohen and others have found this drug of equal value. It may be painted over the chest in the area occupied by the pulmonary disease, but is said to be contraindicated in cases in which there are hemorrhages or well-developed cavities.

A NEW TREATMENT OF MORPHINE-POISONING.

SOME of the readers of the THERAPEUTIC GAZETTE will probably remember the interesting contribution from the Laboratory of Therapeutics of the Jefferson Medical College, made by Dr. Thornton, in which he proved

that permanganate of potassium was the best chemical antidote we have for phosphorus-poisoning. Undoubtedly this influence of the permanganate is exercised through its powerful oxidizing properties, and at the time of his experiments Dr. Thornton proved to his own satisfaction that the permanganate possessed the power of oxidizing many of the vegetable alkaloids, notably morphine. Unfortunately, he did not continue his researches, and in consequence failed to report the results of his studies. In the last few weeks Dr. Moor, of New York, has demonstrated upon animals and upon himself that as much as 3 or 4 grains of the sulphate of morphine can be taken internally, provided a similar or double number of grains of permanganate of potassium are also swallowed at the same time or very shortly after. The results of these studies are of so much importance clinically, in view of the frequency of opium-poisoning, that we trust that further observations will confirm their accuracy, and it would seem that, both on theoretical and practical grounds, there is little doubt that this happy conclusion will be reached. Doubtless many studies will be made within the next few months, and clinical observations will be reported which will place this remedial measure upon a definite basis.

AN ADDITIONAL NOTE ON SUBCONJUNCTIVAL INJECTIONS OF CORROSIVE SUBLIMATE.

IN the issue of the THERAPEUTIC GAZETTE for June, 1893, we reviewed the literature concerning the treatment of various ocular diseases by means of subconjunctival injections of bichloride of mercury, and particularly the communications of Darier upon this method of therapeusis. The opinion then expressed was that this procedure should have wide and universal trial, because only by gathering together the views of unbiassed reporters, based upon large experience in widely diverse affections, could correct conclusions be reached as to its exact value.

Since the publication of this article much additional literature has accumulated, particularly the replies of numerous ophthalmic surgeons to the circular letter sent out by Valude, asking for expressions of opinion concerning the advantages, or otherwise, of this means of introducing mercury into the ocular tissues, a lengthy review of which appeared in the GAZETTE for December, 1893. Among twenty-five answers, fifteen surgeons were more or less favorable to the use of the injections, six were opposed to their employment, and three objected to them on theoretical grounds. One surgeon gave evidence, and that unfavorable, only in regard to their efficacy against trachoma, and another, while he denied virtue to corrosive-sublimate, valued similar injections with trichloride of iodine. An instructive American communication was published in the last issue of the GAZETTE, and represented the experience with the method in the ophthalmic service of Jefferson Medical College Hospital. In this report cases of episcleritis and syphilitic and gonorrhœal iritis were favorably impressed, cases of interstitial keratitis were either not improved or made worse, while cases of corneal ulcers were healed no more rapidly than by ordinary measures, or were aggravated by the treatment.

The theory of the treatment is evident,—namely, that a drug which is believed to be antagonistic to the morbid process shall be introduced directly into the affected organ, and thus come in contact in a concentrated form with the lesion which it is to antagonize. Whether this theory is compatible with facts it is at present impossible to decide, chiefly because we are not yet in possession of sufficient data to understand the fate of the medicinal constituent of the fluid when it comes in contact with tissues into which it is injected. That after penetration, fluids, and hence corrosive-sublimate lotion, find their way through the ocular coats, probably along the interstitial lymphatic lines, mingle with the humors of the eye, and directly bathe its cellular elements, seems undoubted; that certain drugs, thus introduced, particularly soluble salts of mercury, have a species of selective influence upon the uveal tract seems likely; but the exact relation of the physiological action of the medicament—chemical, bactericidal, or alterative—is not definitely known, on the one hand, for the reasons already quoted, and, on the other, because the feebleness of the dose renders it difficult to appreciate how action of any kind can take place.

The latter point is discussed by Lagrange (*Archives Cliniques de Bordeaux*, No. 12, 1893), who introduces some interesting calculations, which are appended. If 5 drops of 1 to 1000 solution of corrosive sublimate are injected beneath the conjunctiva, only about one-quarter of a milligramme of the drug finds entrance; but if iritis, for example, is treated with hypodermic injections of mercury or with mercurial inunctions, the doses are proportionately weak. For example, if for ten days there

is given a daily injection of 5 centigrammes of sublimate beneath the skin (a dose approaching a toxic influence, the usual one being 1 centigramme), fifty centigrammes would result during the time chosen, and these would be obliged to distribute themselves through the entire organism. That is to say, in ten days seventy kilogrammes of tissue (the average weight of the human body) will have absorbed fifty centigrammes of the liquid, and this only on the supposition that the entire amount would be present on the tenth day, when really a great proportion of it would have been eliminated. Now, fifty centigrammes distributed over seventy kilogrammes, gives less than one centigramme for each kilogramme; in exact numbers .0071. Fifty grammes of tissue have evidently received twenty times less sublimate than one kilogramme,—*i.e.*, about three-tenths of a milligramme (in exact numbers .000355). But the eye weighs only eight grammes, and, adding the surrounding soft parts,—orbit and eyelids,—the entire weight does not amount to fifty grammes. If 5 drops of sublimate lotion (1 to 1000) are injected at one time, one-quarter of a milligramme of the drug is at once introduced into the eye and its surrounding parts, while if fifty centigrammes of sublimate lotion are given hypodermically during ten days (and more cannot be safely employed), only about one-third of a milligramme of the drug is introduced into the eye and orbit during the whole period. Lagrange regards this calculation as suggestive, and thinks it should convince those who have doubts as to the rationality of the procedure.

It is unnecessary to point out one or two evident fallacies in this endeavor to apply mathematics to therapeutic influences, particularly in the assumption as to the division and distribution of the drug; but if it is conceded that it helps to answer objections as to the smallness of the doses employed, it still leaves unanswered the remaining and probably most important point,—viz., the exact chemical relation of the medicament to that of the fluids with which it comes in contact. Certain experiments now in progress promise to give more information on this subject than that at present possessed, and when complete will receive due attention in these columns.

THE SURGICAL TREATMENT OF CEREBRAL TUMORS.

THE reactionary tendency noticeable of late in regard to the application of trephining and its modifications to a great variety of cerebral affections makes any communication on the subject from Horsley, a high priest of modern brain surgery, particularly important. The subject he discusses in a late number of the *British Medical Journal* is "Surgical Intervention in Brain Tumors." Horsley does not even consider the general question as to whether operation is justified, provided brain tumor has been diagnosed and localized. This he assumes as a matter of course, and justly so, since, in spite of the long list of fatalities, it is generally conceded by all but the most conservative that operative interference is never more urgently called for than in certain cases of brain tumor. Starr, in his analysis of operations, tabulates eighty-one cases of tumors of the cerebral hemispheres treated surgically; fifty-four out of these eighty-one tumors were successfully located and removed from the brain; thirty-nine of the patients recovered and fifteen died. This, considering the fact that left to themselves death would have resulted in every instance, is sufficient justification.

Horsley states that, in the absence of localizing symptoms, operation is not to be considered. The localizing symptoms, of course, consist in attacks of Jacksonian epilepsy, or local contractions, or local auræ. As pressure becomes more marked, paralysis develops, either of motion or sensation, often somewhat sharply localized at first, but progressive in character. As corroborating symptoms, headache, vomiting, and optic neuritis are usually observed, though the presence of any or all of these last symptoms is by no means necessary for a positive diagnosis, the progressive character of the symptoms indicating the nature of the lesion more clearly than any other single feature of the case.

Given symptoms such as have been just detailed, the question as to how long medical treatment is justifiable is raised by Horsley, and is answered by the statement that six weeks is as long as can be expended in treatment by drugs unless a striking improvement in the symptoms has occurred. Starr names three months as the longest period for medical treatment, and it is allowable to postpone surgical intervention only when during this time there is no rapid increase in symptoms.

Of all the cerebral tumors, gumma and tubercle are alone amenable to medicinal treatment, at least in so far as a definite cure is concerned. It must be remembered, however, that all tumors may show a slight temporary improvement under the influence of iodide of potassium; hence the betterment of symptoms shortly following the inauguration

of specific treatment should not lead to a favorable prognosis being given too early, and particularly should not induce the practitioner to postpone surgical intervention until it is too late. Horsley personally does not believe that even truly gummatous tumors are permanently cured by drugs, though he is quite ready to concede the possibility of cure of tubercular lesions following the administration of arsenic, cod-liver oil, and other appropriate medicines.

Surgical intervention has for its object, primarily, of course, the removal and cure of the tumor. When the growth is strictly encapsulated, and when it is cortical and of moderate size, removal is readily accomplished. These conditions are almost never filled in the case of glyoma, the surgeon rarely being consulted until the growth is too widely disseminated for removal. The benign tumors, gummas and tubercular nodulations, if properly localized, may be removed with every prospect of success. Sarcomas, if taken in their early stages, while still encapsulated, offer a chance of non-recurrence.

But even though the tumor cannot be removed, and hence definite cure cannot be accomplished, operation holds out prospects of alleviation of suffering which more than justifies it. Thus trephining often serves to immediately and permanently relieve the agonizing headache and to put a stop to optic neuritis. Of course, when this process has advanced so far that atrophy has set in, the operation of trephining cannot restore sight, but if there is relief of intracranial pressure before the neuritis has reached its atrophic stage, there is often prompt subsidence of this process and consequently preservation of a satisfactory amount of vision. The vomiting is also, as a rule, immediately relieved by opening the skull, while in some cases the epileptiform attacks cease, or when paralysis has already set in there is partial or complete restoration of function. Indeed, in a few instances, malignant tumors have undergone a process of absorption after exploratory trephining.

Horsley narrates one case of cerebral tumor which could not be removed on account of its size. The tumor affected the ascending frontal gyrus of the left hemisphere. The patient lived for more than two years, with disappearance of the attacks and improvement of the hemiplegia. Post-mortem examination showed that the tumor, which at the time of operation was malignant and rapidly growing, had undergone complete destruction, in consequence of exposure at the time of operation.

As to the technique of the operation, Horsley objects to the use of the hammer and chisel for the purpose of raising a large flap consisting of the bone and soft parts adhering to it. For the removal of the bone he uses a special pattern of mechanical saw and powerful bone-forceps. In his earlier operations a large percentage died from shock. This he avoids by doing the operation in two stages. The first stage consists in exposing the skull and removing the bone. The wound is then closed and the patient allowed to recover. In a subsequent operation this skin flap is raised, the dura is opened, and the tumor attacked directly. The cavity left by the removal of the tumor he believes should be packed, since he lost a case from hemorrhage, the blood finding its way into the lateral ventricle and thence to the fourth ventricle.

Macewen for several years has performed his cerebral and cerebellar operations in two stages; this not only to lessen shock, but to allow the closure by inflammatory adhesions of the subdural space. He cites a number of cases showing the almost miraculous improvement which may follow palliative operations. In considering the subject of reimplantation of portions of skull removed during operation, he holds that, when large areas of the brain are exposed, it is well to preserve the contour of the cranium by replacing the whole slab of bone. Since, were this replaced exactly as removed, necrosis would probably take place, and since it is often difficult to drain when this large piece is put in position, Macewen drills a series of holes one-quarter of an inch in diameter, so that a mere lattice-work of bone is left. This allows of free drainage, and prompt organization takes place. Even if necrosis should occur, this is limited, and the dead portion is readily absorbed.

Cerebral localization has reached a point which apparently enables the surgeon to locate growths, especially in the motor areas, with almost absolute certainty, yet it is instructive to note that Starr's table of eighty-one cerebral tumors shows that the operation was unsuccessful in seventeen because the growth was not found by the surgeon at the point at which it was supposed to lie. Starr states that in some of these cases "the local symptoms were clearly insufficient to indicate the position of the tumor, and the cautious neurologist would not have advised an attempt to find it. In other cases the local symptoms were well marked and the diagnosis seemed clear, yet the tumor really lay at such a depth as to be inaccessible, or was so infiltrated in the brain as to make its removal impossible."

Reports on Therapeutic Progress.

TREATMENT OF CHRONIC ULCER OF THE STOMACH.

The great difficulty of properly treating stomach ulcers in private practice, owing to the careful dieting necessary, has led to a new mode of treatment. During the past four years DR. STEPP (*Therapeutische Monatshefte*, November, 1893) has used chloroform-water with bismuth subnitrate. The latter he does not consider necessary. He gave only the following formula:

Chloroform, 1 part;
Aqua, 150 parts;
Bismuth subnitrate, 3 parts.
Sig.—1 to 2 spoonfuls hourly.

Dr. Stepp remarks that chloroform taken internally as aqua chloroformi is never an anodyne and has not the slightest pain-alleviating property. He gives the history of seven cases chosen from a very large number. As soon as the diagnosis is confirmed, the chloroform treatment can be begun. The refreshing taste of the chloroform-water combats most actively the nausea and thirst after the bleeding, and any tendency to further bleeding is stopped by the styptic properties of the chloroform. In new as well as long-standing ulcers there is soon a marked improvement; the color of the face improves vastly.

All the patients said that each time, after taking any, they felt a burning in a certain part of the stomach, doubtless the place of the ulcer, which disappeared after eight to ten days.

He never found any harmful influence upon the rest of the body.

GALLANOL IN ECZEMA AND PSORIASIS.

In a brief article, P. CAZENEUVE and ET. ROLLET (*Lyon Mèdical*) call attention to the therapeutic value of gallanol in skin-disorders, particularly in eczema and psoriasis. In certain forms of subacute and chronic eczema gallanol proved to be a first-class therapeutic agent. Cases cured by it show no tendency to relapse, but the use of the drug must be conjoined with a suitable internal treatment and regulation of the diet. Under the influence of the medicament, itching and oozing disappear soon, and desiccation is rapidly established. For these cases gallanol may be employed in the form of powder, or in that of ointment with traumaticine, in the strength of .5, 1, 2, and 3 grammes in 30 grammes. In psoriasis, especially in the mild form of the disease, the action of the new remedy is decided. The agent can be applied with advantage to the scalp, face, and neck, since its action is more rapid than that of alkaline substances. In these cases gallanol may also be employed in the form of ointment with lard or traumaticine, in the strength of 1, 2, and 3 grammes in 30 grammes. The parts must be thoroughly cleansed before the application of the medicament. The authors have similarly obtained good results from the application of a brush of this solution:

Alcohol at 93° F., 50 grammes;
Gallanol, 10 grammes;
Liquid ammonia, 1 gramme.

In these proportions the ammonia exercises no caustic action. In old, rebellious cases of psoriasis, gallanol seems to be less active than chrysophanic acid, pyrogallic acid, and especially the iodo-chloride of mercury; but it has the advantage over these remedies in not being poisonous. Patients can handle the new medicament almost with impunity.

SULPHATE OF MAGNESIUM IN THE SUMMER DIARRHŒA OF CHILDREN.

PATTERSON, in an article in the *Pittsburg Medical Review*, calls attention to the use of magnesium sulphate in summer diarrhœa, in an interesting communication. He believes the indications for treatment are to remove the cause, if known, and prophylaxis. To meet the first, sulphate of magnesium seems to him to be, theoretically at least, the ideal remedy. As to its practical utility, this report will speak conclusively. To meet the second indication, sterilize the food.

The administration of the sulphate of magnesium calls forth a profuse secretion from the intestinal glands. The remedy is a powerful alkali. It stimulates peristalsis, either directly or indirectly, through the quantity of secretion poured out or by producing a free flow of bile,—one of the natural stimulants to peristalsis.

Thus we have a remedy which, first, corrects the irritating properties of the contents of the stomach and intestines by rendering them alkaline; second, stimulates the glands to a more profuse secretion, thereby unloading a congested mucous membrane and possibly washing out the products of fermentation; third,

finally flushing the entire bowel, thereby removing the fermenting mass.

In the twenty-five selected cases treated by the author during the month of August, 1892, at the Pittsburg Free Dispensary, the symptoms were those usually found in the disease under discussion,—namely, vomiting, diarrhœa, ranging from the "chopped spinach" stools, mixed with mucus and streaked with blood, to the rice-water discharges, coated tongue, restlessness and general prostration, etc.

The ages ranged from one to six years. The dose and mode of administration of the remedy were as follows: The mother was directed to give a child a year old an even teaspoonful of sulphate of magnesium, sufficiently moistened to swallow, as soon as she arrived at home, the process to be repeated in the morning and the child to be brought back at 3 P.M. on that day.

This procedure was repeated daily at the same hours till the discharges became *yellow*. For the older children the dose ranged from a heaping teaspoonful to a heaping tablespoonful.

As a result of the exhibition of these doses, the mothers reported the children relieved of pain and restlessness with the induction of quiet sleep. No difficulty was experienced in the administration of the remedy because of its objectionable taste. The after-treatment consisted of general tonics and prophylactic precautions.

REPORT OF THE DURATION OF THE DISEASE IN THE SELECTED CASES.

	Days.
1	19
1	5
2	4
17	3
4	2

In the case lasting nineteen days the child suffered several relapses, owing to the mother's carelessness, and was finally sent to the hospital. The other twenty-four cases all did well and thrived under properly-regulated diet and tonics. The latter were selected according to the necessities of each case. Those most frequently used were syrup of iodide of iron, cod-liver oil, compound syrup of the hypophosphites, strychnine, quinine, pyrophosphate of iron, etc.

This list includes all of the cases that were selected for trial by this remedy, and the practically uniform beneficial results obtained in the treatment of this so often intractable disease warrant their record.

THE THERAPEUTIC USES OF ASAPROL.

DUJARDIN-BEAUMETZ and STACKLER (*Bull. Génér. de Thérapeutique*) have published an elaborate therapeutic study of this medicament. *Asaprol* is the sulphuric ether of beta-naphthol, in the form of a calcium salt. The drug is exceedingly soluble. Its antiseptic equivalent is more or less that of the salicylate of sodium,—that is, in the proportion of 16 to 17. Asaprol is rapidly eliminated by the urine, in which it is detected by the addition of a few drops of the perchloride of iron, this process giving a bluish-black coloration.

The authors have administered the drug in doses of from 1 to 10 grammes (6 grammes being the medium amount employed), either in cachets of 1 gramme each, or, preferably, in solution in water, coffee, and other similar vehicles. They have used the remedy in a variety of disorders, as antithermic and analgesic: *a*. Acute and subacute polyarticular rheumatism, muscular rheumatism, muscular pains, etc. *b*. Influenza, various typhoid states, amygdalitis, pharyngitis, furunculosis. *c*. Certain cases of asthma were apparently relieved by the medicament. Similarly, as an analgesic, it was found serviceable in various neuralgic conditions, such as intercostal neuralgia, sciatica, and particularly dental neuralgia. The drug has rendered good service especially in the acute and subacute forms of polyarticular rheumatism, in muscular rheumatism, and in influenza. In doses of 6 grammes it has produced in the acute and subacute types of polyarticular rheumatism as good results as the salicylate of sodium.

A solution of asaprol in distilled water, intravenously injected into an animal, is more toxic than a similar solution of the salicylate of sodium; but by the stomach the former is incomparably better tolerated than the latter medicament. The salicylate of sodium often produces, even in small doses, first, vertigo, buzzing in the head, a peculiar cerebral disturbance, nausea, and vomiting; secondly, in patients suffering from albuminuria, the same amounts increase the quantity of albumin in the urine and cause nausea and vomiting. The salt, in one word, is apt to aggravate the condition of previously-diseased kidneys. The possible occurrence of these symptoms in patients suffering from renal affections constitutes, in the opinion of many physicians, the chief danger in the employment of salicylic acid. Therefore the administration of salicylate of sodium is condemned even in cases of slight albuminuria.

Asaprol is well borne: First, in doses of from 4 to 6 grammes, in the form of cachets or in solution, by patients who cannot tolerate the sodium salicylate, quinine, or antipyrin; secondly, in amounts of from 3 to 5 grammes, by dyspeptics who not only cannot tolerate any one of these medicaments, but who are unable to retain food; thirdly, asaprol never produces vertigo, buzzing in the head, cephalalgia, nor any cutaneous eruptions; fourthly, in patients who, in the course of an acute disease, suffer from a slight albuminuria, the drug, in doses of from 4 to 8 grammes, does not increase the condition, nor does it prevent its disappearance, the albuminuria passing off before the suspension of the treatment; fifthly, patients suffering from chronic nephritis, and in whom all medicine, all food, even milk, exercises a noxious effect, tolerate well the drug under study, in doses of from 3 to 4 grammes. In these cases asaprol does not increase the amount of albumin in the urine, neither does the medicament cause nausea, vomiting, or any nervous trouble. The authors, therefore, believe that neither the dyspeptic state nor renal disease, particularly those cases that rebel to the treatment by the salicylates, constitute a contraindication to the employment of asaprol in the doses mentioned.

THE TREATMENT OF TUBERCULOSIS WITH INJECTIONS OF SERUM OF IMMUNIZED DOGS.

In the Congress for the Study of Tuberculosis, held at Paris from the 27th of July to the 2d of August, 1893, BABES, of Bucharest (*Bull. Génér. de Thérapeutique*), treated of the above subject. Before Koch's time, Cornil, Leloir, and the author, in 1883, tried vaccination with attenuated tubercular matter of lupus against the most virulent forms of tuberculosis, but without positive results. During Koch's investigations, Grancher employed cultures of tubercle bacilli attenuated by age, and obtained remarkable results in the inoculation of a rabbit against tuberculosis. The personal experience of Babes, the results of which were announced to the Académie de Médecine in 1890,—that is, before the publication of Koch regarding the nature of his remedy,—demonstrated that tuberculosis of birds and its products render guinea-pigs less susceptible to tubercular infection. Later, Courmont, Héricourt, and Richet have confirmed and extended these results by showing that the dog, which appears to be refractory to bird tuberculosis, may be rendered refractory to human tuberculosis by injections of cultures from bird tubercles. The researches of the author on the dog, in this respect, have not been conclusive, yet he has observed two dogs that have continued to resist the inoculation of even large quantities of cultures of human origin, after they had been subjected to the action of considerable amounts of virulent cultures from bird tuberculosis. He has employed a process of immunization, which consists in using tuberculin at the beginning, then continuing the vaccination with old and fresh cultures of both bird and human tuberculosis, and augmenting the power of resistance in the animals experimented upon by periodically inoculating them with increasing doses of cultures and their products of virulent tuberculosis. This method, however, has not been attended with success, and is often accompanied by serious complications. Of seventy-two inoculated animals, only seven were found to be immuned in the course of about one year. These unsatisfactory results are believed by the author to be due, on the one hand, to microbian associations, and, on the other hand, to the parenchymatous nephritis produced. The method, therefore, should not be resorted to in human therapeutics.

Since the serum of the dog is absolutely harmless to man, Babes has recently employed the serum of immunized dogs in the treatment of human tuberculosis. The dose administered has varied from 5 to 10 grammes of antitubercular serum to which has been added a one-per-cent. solution of phenic acid. The cases treated have been few, and as yet no positive conclusions can be drawn, but the author affirms that the tubercular patients subjected to the treatment have been benefited. He therefore recommends the employment of preventive inoculations of serum of strongly-immunized dogs in children of tubercular parents, and who are almost sure to become affected with the hereditary disease.

ICHTHYOL IN THE ABORTIVE TREATMENT OF ERYSIPELAS.

HALLOPEAU (*Les Nouveaux Remèdes*) details an interesting case of erysipelas, in which the most satisfactory results were obtained from the local application of ichthyol. The remedy speedily stopped the progress of the disease. The results confirm, according to the author, the great efficacy and the complete innocuousness of the treatment of erysipelas by ichthyol, and lead to the safe statement that in this drug we have a remedy that is capable of aborting

erysipelas in the course of twenty-four hours, and at any period of its evolution. Hallopeau employed a mixture in which collodion is substituted by a solution of gutta-percha and chloroform, this latter known under the name of *traumaticine*. The combination, which has a syrupy consistence, is as follows:

℞ Gutta-percha,
Chloroform, of each, 25 grammes;
Ichthyol, 50 grammes.

This is applied, not upon the diseased parts, but around these, that a barrier may be formed, so to speak, against the progress of the malady.

THE USE OF SALICYLATE OF SODIUM IN PLEURITIS.

Dr. Herz (*Wiener Medizinische Wochenschrift*, No. 41) replies to remarks made on an article in which he reported three cases of pleuritis successfully treated with salicylate of sodium, which article appeared in 1889.

Since that time he has treated over thirty cases in most varied stages of the disease, always with good results. There was no formation of exudation where the case came under treatment early.

THE ACTION OF SALICYLIC ACID ON THE WOMB.

Professor C. Binz (*Berliner Klinische Wochenschrift*, No. 41) reviews the literature of the action of salicylic acid upon the womb, after having a case in which the use of seventy-five grains of it within a few days produced an abortion at three months.

Binz thinks the salicylic acid is not alone to be blamed in the cases reported, since its action was only bad in thirty-three per cent. of the cases, and these not the ones where the largest doses were given.

He concludes that at present we may gather:

1. That salicylate of sodium is worth trying for painful, late, and insufficient menstruation.

2. If for rheumatism, etc., it seems to be indicated, it must be given with caution if a tendency to miscarriage or premature birth exists, or where one is not sure of the contrary. The same holds also of the tendency of the non-pregnant womb to bleeding.

Binz hopes such a useful remedy will not be abandoned, but that it will continue to be cautiously used during pregnancy, and that further experiments will give us more exact proof of its action.

ATROPINE FOR CHRONIC MORPHINE-POISONING.

Professor W. Koch (*Therapeutische Monatshefte*, November, 1893) reports a severe case of chronic morphine-poisoning which he treated successfully with atropine. The patient was a lady of thirty-eight years of age, who had used morphine injections for fifteen years. When she came under Dr. Koch's care she had, after leaving an institution, obtained large quantities of morphine on the journey home. Her eyes were glued shut with severe conjunctivitis. There was a considerable collection of mucus in the bronchi, which was not expectorated. The rattling sounds were constantly audible all over the room. The skin was moist, covered with viscid sweat; there was severe stomachache, vomiting, severe diarrhœa, constant unrest. The patient lay on her back in bed; there were twitching movements of the legs. She was without the least interest in her relatives, simply demanding more morphine and strong hypnotics; 45 to 60 grains of chloral were given internally or in an enema. When using 7 grains of morphine in twenty-four hours, marked signs of deprivation of morphine appeared. The strength diminished more rapidly, all bad symptoms increased, specially the collection of mucus in the bronchi.

This condition induced Professor Koch to try small quantities of atropine. Of compressed tablets, containing $\frac{1}{3}$ grain morphine and $\frac{1}{180}$ grain atropine, he gave two during the first four days. These produced a marked improvement in the general condition; the bronchial catarrh and diarrhœa were specially improved. In the first four days $10\frac{1}{2}$ grains morphine was the minimum; after eight days only $4\frac{1}{2}$ grains were necessary. From the fifth to the eighth day only one morphine-atropine tablet was injected, and at the end of ten days $\frac{5}{6}$ grain sufficed. The patient had grown heavier, could walk, and the lameness had, by the use of electricity, nearly gone. But when the morphine was still further lessened, the insupportable hunger for it produced a very depressed state, so he was obliged to give another tablet. He was finally, after two months, able to get her into fairly good condition and using only $\frac{2}{3}$ grain of morphine daily. When sent home she soon relapsed again and returned, so that he used the morphine-atropine tablets five times, each time with the same result.

He concludes that,—

1. Atropine removed in a surprisingly short time the severe exudation of the air-passages, the bowels, and the skin.

2. The atropine moderated very much, as it seemed, the symptoms due to the abstinence from morphine and hastened the possibility of gradually withholding it.

THE ABSORPTION OF SALICYLIC ACID THROUGH THE SKIN AND THE TREATMENT OF ACUTE RHEUMATISM OF THE JOINTS.

PROFESSOR DR. BOURGET (*Therapeutische Monatshefte*, November, 1893) gives a review of the efforts to prove how much of any substance is absorbed through the skin. He gives brief histories, with temperature charts, of nineteen cases of acute rheumatism which were treated only externally. The diseased joint was anointed with ten-per-cent. salicylic salve and bound with flannel. The result proves that no internal dose is necessary; but having thus proved this, Bourget says he will use in future small doses of a salicylate preparation, preferably salacetol, in daily doses of from 15 to 30 grains. The pain is quieted with great rapidity by the external treatment. The swelling also diminishes rapidly and the fever falls gradually. He thinks the internal dose will prevent a slight relapse, which frequently occurred on the fourth, sixth, or even the eighth day. Complications were very rare; in the nineteen cases only twice did a slight pericarditis occur. In one instance it was accompanied by a slight effusion, which was quickly absorbed; there was no effusion in the other.

In conclusion, he finds that,—

1. Salicylic acid is quickly and intensely absorbed through the skin. The skin of young persons is much more capable of absorption than that of older ones, and the skin of blondes is more readily penetrated than that of individuals with black hair or dark skin.

2. The rapidity and strength of this skin absorption depend upon the vehicle with which the salicylic acid is used. Only when fatty substances are used can the skin absorb it readily; when vaseline or glycerin is used, the absorption either does not take place or is very slight.

3. The treatment of acute joint rheumatism with a salve prepared from salicylic acid and turpentine is very much to be commended.

4. This salve is less efficient in other forms of rheumatism, but may serve as an aid to massage in treating them.

5. In cases of gonorrhœal rheumatism it has no effect.

THE ACTIONS OF APOCODEINE.

From an elaborate experimental study of the physiological actions of apocodeine, L. GUINARD (*Lyon Médical*) draws the following interesting general conclusions:

1. Apocodeine, contrary to what is generally held, is not an emetic.* When the drug produces nausea, it is probably due to impurities and to its containing small amounts of apomorphine.

2. When .002, .010, or .048 gramme of apocodeine hydrochloride per kilogramme of the body-weight are intravenously injected into a dog, there is immediately produced a great nervous excitement, followed by violent convulsions, in the midst of which there are perceived symptoms of cerebral depression. During this convulsant period there occur acceleration of the heart's action and of the respiration and an elevation of the bodily temperature. This action of the drug may also be observed secondarily, after subcutaneous injections of from .05 to .06 gramme per kilogramme of the body-weight.

3. When apocodeine is administered hypodermically, in the proportion of .025 to .035 gramme per kilogramme of the body-weight, it only produces a calming effect on the dog. It causes a slight, quiet sleep, without provoking emesis or primary excitement. This phenomenon resembles the physiological sleep; the animal assumes a normal attitude, and, on being approached, awakes without evincing unusual disturbances, and, on the whole, does not show the peculiar hyperexcitability characteristic of animals under the influence of morphine. The same effects are produced by intravenous injections of apocodeine, but in these instances the drug should be introduced in dilute solutions and very slowly.

4. The disappearance of the soporific effects takes place in a simple manner; the animal awakes, but does not show the symptoms of hebetude and general malaise following the action of morphine. Four or five hours afterwards no trace of the medication is observed. The action of the drug is generally fugacious.

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* After the publication of this study had begun, Fröhner, of Berlin, published a paper, in which he declares, like the author, that apocodeine is not an emetic, nor does it produce nausea. The same Fröhner, without having made any analysis, pointed out the expectorant and narcotic properties of the drug, produced upon the dog, in hypodermic doses of .25 gramme. He does not describe the character of the sleep produced by apocodeine, and only and simply compares it with the narcosis caused by morphine.—*Monatsh. f. Praktische*, No. 6, vol. iv., 1893.

Apocodeine is rapidly eliminated, especially by the kidneys.

5. Following the administration of a calming dose of apocodeine, there almost always occurs a short period of cardiac and respiratory acceleration, accompanied by a slight elevation of the arterial pressure. On the other hand, during the period of sleep produced by the drug, both the heart and the respiration are slowed, and the arterial pressure is maintained at a little below the normal height. The slowing of the heart is not accompanied by disturbances in its rhythm, there being no intermittences. The action of apocodeine upon the heart is of medullary origin, as shown by previous section of the vagi. The diminution of the blood-pressure appears to be due more to the slow action of the heart than to an active vaso-dilatation.

6. During the somniferous action of apocodeine there is a reduction of the temperature varying from 1.8° to 2° F. This phenomenon is probably due, 1, to the immobility of the animal and to muscular relaxation; 2, to the modifying influences exercised on the heart and the respiration, and on the interchange of gases.

7. Under the influence of apocodeine there is produced a diminution of the intrapulmonary and intraorganic interchange of gases, manifested, 1, in a decrease of carbon dioxide and an increase of oxygen in the expired air; 2, in an increase of both the oxygen and carbon dioxide in the blood. This phenomenon is analogous to the one observed by Arloing during the hypnotic action of chloral, and to that noticed by the author in his studies of morphine, showing that there appears to be a distinctive peculiarity between an hypnotic action and an anæsthetic action.

8. Apocodeine, in all doses, produces always a hypersecretion of saliva, of bile, of the pancreatic and intestinal juices, and of that of the majority of mucous glands. These hypersecretory effects are the result of a central action and not of a special influence exercised by the medicament upon the peripheral elements, particularly the glandular ones. The experiments performed on this part of the subject support conclusively the statement just made.

9. Intestinal peristalsis is considerably increased by apocodeine, such functional change being due to an exciting influence exercised by the drug upon the ganglionar sympathetic centres.

10. The changes produced by apocodeine originate in the primary actions exerted upon the nervous system. They first show themselves upon the brain, but they are afterwards extended to other parts of the organism. These actions are depressant when the dose ingested is moderate; depressant and afterwards convulsant when the dose has been large but slowly administered; and, finally, convulsant from the onset when the dose is so introduced as to be rapidly absorbed by the organism.

11. The depressant effects upon the medulla spinalis, as shown by the posture assumed by dogs under the influence of apocodeine, are secondary; they are slowly produced and very moderate in those animals that have been deprived of the brain or in which previous section of the medulla has been practised. This last remarkable fact only shows the dominant action of cerebral centres upon the lower ones and their susceptibility to the action of drugs. The primary depressant effect upon the brain is communicated to the medulla oblongata and to the cord, and determines a functional inertia of these inferior centres which, without the influence of the brain, resist for a long time the direct action of the drug in question.

12. As depressant effects upon the cord may be produced independently of a cerebral action, the convulsant effects of apocodeine and the accompanying disturbances are similarly the result of a direct action upon the cord.

13. The convulsant action of the drug is followed by sensory and motor paralysis of the whole nervous system, these phenomena being best observed in frogs.

14. The previous administration of apocodeine, as in the case of morphine, favors the consecutive action of an anæsthetic.

15. During the sleep produced by apocodeine, the pupil is but little changed; it is dilated during the convulsive period, especially when the dose is poisonous. This dilatation attains its maximum in dogs, and especially in cats.

16. Cats show the same resistance to the depressant cerebral action of apocodeine as they do to the somniferous action of morphine. To these animals the drug under consideration is always excitant, enormously increasing the secretions and producing death by tetanus.

17. Comparing the effects produced by apocodeine with those caused by codeine, there will be found well-marked analogies, especially in regard to the ability of both drugs in producing sleep and in exercising a convulsant action. But a close examination of the subject will also show that there exist between the two medicaments notable differences in their actions. Codeine is less powerful as a hypersecretory and calming agent, but a more active

convulsant and more dangerous, therefore, than apocodeine. This last substance, although less powerful than codeine, is, on the other hand, more constant in its effects.

On the whole, the author, judging from the results obtained in his elaborate research, does not hesitate to recommend the *substitution of apocodeine for codeine in all those cases in which the former medicament is indicated and employed.*

EXPERIMENTS AND CLINICAL OBSERVATIONS ON THE ACTION OF CHLOROFORM.

In the *Lancet* is given an interesting account of a study upon the effects of chloroform.

The results of fifty experiments performed on animals at the Veterinary College of Glasgow is believed to prove that when chloroform is inhaled there is an action exerted by the vapor on the respiratory tract, and that a reaction ensues when the inhalation is discontinued, while it is maintained that both experiment and clinical observation combine to show that this reaction is the cause of primary syncope when allowed to take place at certain stages of the inhalation. A most important question, therefore, is, How long does the vapor take to escape from the lungs when the inhalation is discontinued? Dr. Snow concluded from the odor of the breath and from an observation on a man who inhaled the smoke of a cigar, that the vapor was completely discharged from the lungs with three expirations, and Kirk's observations on patients and on a rabbit, cat, and dog confirm this and seem to show that the lungs must be emptied in from ten to twenty seconds. The time taken to charge the lungs may be passed over, as well as the probable effects which are produced by the action of the vapor, for the reaction which follows is the most important question to be considered, and constitutes in itself an irrefragable proof of the action that had taken place previously. It must here be mentioned that rabbits, cats, and small dogs were chloroformed in a large glass vessel with a close-fitting lid, of a capacity of four thousand five hundred cubic inches, and which had been previously charged with a given percentage of vapor. When observations were made on the heart, the action was previously determined by auscultation, a binaural stethoscope being used in all but a few early experiments. An experiment on a rabbit and another on a guinea-pig seemed to show that no reaction of any importance with respect to the heart's action occurred in these animals. No observations on the pupils were made in these cases, but it may be claimed for those which were made on the pupils of the cat that they led to results of the most beautiful and decisive character. When a cat's pupil is dilated it is circular, as it contracts it becomes oval, and it finally, in the strongest contraction, appears as a mere line. The yellow iris so common in cats renders pupillary changes easy of observation. In one experiment a cat inhaled four per cent. of chloroform for two minutes. When taken out of the jar the pupil was widely dilated, and it contracted to a minimum in fifteen seconds; this lasted for forty-five seconds, when there was sudden and wide dilatation and the cat recovered. In two other experiments the contraction took place in ten seconds and the sudden dilatation occurred a minute afterwards. Similar results ensued in two cats that breathed four per cent. of chloroform for one minute. This contraction cannot depend on further absorption, for so long as the cat remains in the vapor the pupil remains dilated; and it is equally clear that it must be due to a sudden reaction, otherwise the pupil would gradually return to its normal condition. In deeper anæsthesia these results were considerably modified, but they may be meanwhile omitted.

It now remains to show that the vapor reaction leads to stoppage and great irregularities in the action of the heart in cats. A considerable number of experiments were performed to determine this, but it will only be necessary to instance a few. In four experiments four cats inhaled four per cent. of chloroform for one minute. In one instance the observation was a failure, owing to the resistance of the animal, and in another the cardiac rate, which had been 140 before the inhalation, was extremely rapid when the cat was taken out of the jar; but there was a sudden stoppage in half a minute, which lasted for about five seconds, and this was followed by extreme irregularity for a minute and a half, when the cat recovered. There were pauses between individual beats in this case, sometimes after every third beat, while the sounds were very weak during this irregular action, and the same may be said of other cases. In the other two experiments the results were similar, rapid but regular action of the heart, ending in sudden stoppage and irregularities in about half a minute. In two other experiments, in which two cats inhaled the same percentage for two minutes, there was not much difference in the results. In eight experiments the several cats breathed three and a half per cent. of chloroform for two minutes, and subsequent stoppage and irregularities occurred in five of these. In one the heart was

irregular when the animal was taken out of the jar, but stoppage did not occur till some time afterwards. In another the cardiac rate, which had been regular and quick when the animal was taken out of the jar, became extremely irregular with frequent stoppages in half a minute, and this condition lasted for no less than four minutes and was associated with convulsive movements of the muscles of the thorax, the irregularities of the heart being more marked when the latter occurred. This is important to notice, as the concurrence of these two phenomena, though rare in cats, is common in dogs, and probably also in the human subject. Two days after the eight preceding experiments were made, the five cats that had shown irregular action of the heart being caused to inhale the same percentage of chloroform (three and a half per cent.) for a longer time, —for four, five, six, seven, and eight minutes respectively,—more or less irregular cardiac action occurred during recovery in all, and in two it was marked and prolonged; but it was observed that the irregularities were longer in manifesting themselves. In one, for instance, the cardiac rate had been 180 before inhalation and very regular, but after inhalation of chloroform for five minutes it was found to be 140 and regular; it suddenly rose about the beginning of the second minute after the administration was suspended to over 200; at the end of the second minute irregularities began, with changes in the "lubdupp" difficult to describe, and continued for eight minutes; and it was ten minutes from the commencement before the cat recovered. In the next case, in which another cat remained in the same percentage for six minutes, slight irregularities occurred in two minutes after cessation of the inhalation, but the cardiac action became regular in three minutes after removal from the vapor, and the animal recovered completely in less than five minutes altogether. In the last of the five experiments, in which a cat inhaled three and a half per cent. of chloroform for eight minutes, the cardiac rate was distinct and fast (240) for four minutes after, but it then suddenly became slow and irregular, and this continued for two minutes, when the cat recovered and the heart was found to be quite regular (160).

These results showed that very deep anæsthesia in the cat did not always modify reactionary effects on the heart, but the fact that the stoppages were longer in occurring after deep anæsthesia proved that the latter were not due to absorption of the chloroform, and that they could only be accounted for by the vapor reaction. The cardiac rate was often 240 during the reaction and the irregularities were coincident with a very sudden slowing. The binaural stethoscope permitted auscultation with very little pressure on the chest-wall. In a few experiments (with a long stethoscope) the cardiac action and the state of the pupils were observed at the same time, and it was found that contraction of the pupils was coincident with rapid action of the heart, and that dilatation corresponded with slowing and irregularity. It will have been observed that when the irregular heart's action was of short duration, the cat recovered in less time than it had been exposed to the vapor of chloroform, but that if the irregularity lasted longer, it was quite otherwise,—facts which are of great importance. The irregular action commences when the last drop of chloroform has left the blood, but as long as it continues the animal is as passive as if under the influence of a profound dose of the agent.

Forty experiments having been thus far performed in the inquiry, there remained only ten to be done on dogs. A very pronounced struggling stage takes place in the latter, this being almost entirely absent in cats. When this was at its worst, auscultation was found to be impossible, and it was often aggravated after the administration of the chloroform had ceased; but the observations which were made when the struggling had somewhat subsided, or even after it had passed off, were sufficiently conclusive. These showed that the dog was liable to similar stoppages of the heart as the cat, and that they were almost invariably associated with spasms of the respiratory and other muscles. They further showed that deep anæsthesia modified or altogether prevented these effects on the heart, and this is a vital part of the inquiry. It was found, moreover, that immediately after the struggling stage, and when the animal was quiescent, the anæsthesia was, nevertheless, not deep enough to prevent irregular cardiac action. In an experiment which was made on a male terrier, about two stone in weight, the animal inhaled two drachms of chloroform from a warm, dry towel for one minute. For the first minute during recovery the action of the heart was very rapid, but owing to some struggling it could not be counted. The struggling then became so violent that the dog was released, and it rolled on the floor for two minutes, moving its legs with great rapidity. On becoming comparatively quiet, the heart's action was found to be feeble and very irregular, there being frequently pauses between every beat, while the beats were very weak. In another experiment on the same animal, which was made six days afterwards, the dog inhaled four per cent. of

chloroform in the jar till complete anæsthesia was induced. Previously to this the action of the heart had been slightly irregular, the rate being from 116 to 120. All movements ceased in two minutes, and the dog was removed from exposure to the chloroform after one minute more, when it was found to be quite motionless and relaxed. The action of the heart was found to be regular and slow (88) for half a minute, but it rose regularly during the next half-minute, and during the second minute it was 140, regular, full, and strong, when the dog recovered. In another experiment, a small dog, fourteen pounds in weight, breathed four per cent. of chloroform till twenty-five seconds after the struggling had ceased, being quite flaccid when removed from the jar. Nevertheless, the heart's action, which had been regular when the dog was removed, soon became extremely irregular, and then rose to 240, subsequently slowing to 140, with marked irregularities lasting for fully a minute. When, some days afterwards, the same animal was kept in the vapor for one minute after it had become flaccid, there was no irregular action of the heart during recovery. Four more experiments with other dogs gave similar results.

It is maintained that the stoppages and irregularities of the heart, as above described in experiments on cats and dogs, correspond with and explain the fall of blood-pressure to zero which has been observed by some experimenters after the administration of the chloroform has been discontinued, and also the syncope of sudden failure of the pulse which has been so often noted clinically in the human subject. According to this view, chloroform syncope is analogous to syncope from other causes. The sudden removal of pressure from a large blood-vessel—*i.e.*, the cessation of a force previously acting—may cause syncope. When men have been subjected to a pressure of several atmospheres they cannot be brought back suddenly to the normal atmospheric pressure without incurring the danger of syncope, and this syncope may prove fatal. Further, it has been seen that chloroform syncope coincides with a sudden transition from a quick to a slow cardiac rate, and the same has been observed in some other forms of syncope. Some clinical observations that have been made at the Western Infirmary, Glasgow, with a binaural stethoscope, may be briefly noticed. In one case the heart's action rose from 100 to 152 in half a minute, and in another it rose from 84 to 132 during the first minute, and to 152 before the expiration of one minute and a half, and similar results were seen in other cases. In all instances the cardiac rate returned to normal just as the patient was pronounced "over," and only one case occurred which tended to prove that the quickened cardiac rate, instead of gradually slowing, may suddenly drop to a slow action, just as we have seen it do in dogs and cats. In this case the cardiac rate rose in two minutes to 132, and so continued for the next minute, but during the fourth minute there was an instantaneous fall to 96, although the action continued to be tolerably regular. It is probable the chloroformist allowed a vapor reaction to occur by not renewing the dose of chloroform soon enough. What were the consequences? The patient began to talk loudly and to struggle violently, and within a minute his breathing gave cause for anxiety. If it be objected that the reaction did not give rise to syncope in this case, the answer is that it was less in degree than it might have been, and there can be no doubt that these milder instances occur frequently. The coincidence with experimental results to be remarked is the instantaneous transition from the quick to the slow cardiac action, and this has been found to be associated in other cases in the human subject with irregular action and actual syncope. Deep anæsthesia in dogs and the human subject prevents this untoward result, but space forbids the discussion of the question why this should be so. The chloroformization ought to go on to deep anæsthesia in spite of coughing, struggling, or apnœal pauses of even a whole minute's duration. The use of the binaural stethoscope would be of great value in our infirmaries, and might be expected to throw light on disputed questions.

AMMONIUM CHLORIDE AS A REMEDY IN CYSTITIS.

Dr. George Corrie has published in the *Virginia Medical Monthly* his views concerning chloride of ammonium in catarrhal states.

Directing his attention somewhat particularly to the diseases of the pelvic organs, the writer has had the opportunity to make trial of numerous vaunted agents, old and new, for the relief of cystitis, and finding the simple chloride of ammonium so much superior to all others, calls the attention of the profession thereto.

Some of the conditions mentioned demand operative or other measures for radical cure, but the above-named drug will be found of material service in preparing cases for operation, in palliating cases unsuited for operation, and as an adjuvant where other treatment constitutes the main feature.

A No. 1 capsuleful of Squibb's pulverized purified ammonium chloride should be taken three or four times in the twenty-four hours, preferably when the stomach is somewhat empty, each dose to be followed immediately by a half goblet or a goblet of pure cold water.

The following are some of the conditions in which the drug has been given faithful trial, with most satisfactory results in *every instance:*

Cystitis dependent upon stone in the bladder, stricture, hypertrophy of the prostate, deposits of urates, etc., gonorrhœa (male and female).

Cystic irritation from uterine disease or menstrual disorders, malarial effects, masturbation, early pregnancy, simple urethritis (traumatic) in newly-married women.

Cystic and renal sequelæ of *la grippe*.

In the majority of cases it was surprising to note the rapidity with which the urine was cleared of bladder mucus, blood-corpuscles, pus-corpuscles, urates, phosphates, etc., the distressing symptoms disappearing therewith, and in no case did the salt occasion any gastric or other disturbance when taken as ordered.

No explanation of the *modus operandi* of the remedy is offered. Only practical experience is here given, with the sincere hope of aiding those whose opportunities have been limited in the treatment of the diseases of the genito-urinary organs.

Fill the capsules only as needed for administration, as the salt dissolves the gelatin in a short time.

PRACTICAL OBSERVATIONS ON THE FORMULAS AND ACTION OF CERTAIN DIURETICS AND PURGATIVES IN THE TREATMENT OF SOME FORMS OF DROPSY, RESULTING FROM VARIOUS CAUSES, AS CARDIAC AND RENAL DISEASES.

In the *Virginia Medical Monthly*, Dr. Joseph Jones contributes a paper on this subject.

The successful treatment of dropsy must be based upon a knowledge of its various causes and effects and upon the action of the various remedies employed.

Derangements of the due relationship of secretion to absorption in the tissues and cavities of the body may depend upon,—

1. Derangements in the nutrition of the tissues, leading either to the increase of secretion or diminution of absorption.

2. Derangements or alterations of the blood, leading to derangements of the nutrition of the tissues, with an increase of secretion or diminution of absorption.

3. Derangements of the circulatory apparatus attended with venous obstruction and congestion, increased serous effusion from the distended blood-vessels, and diminished absorption.

4. Derangements of the functions of those organs which regulate the amount of the blood, as well as its constitution, by regulating the amount of the watery element by the elimination of excrementitious materials.

A. Dropsy arising from the prolonged action of the malarial poison, characterized by destruction and diminution of the colored blood-corpuscles, splenic enlargements, and hepatic derangements.

Chronic hepatitis, parenchymatous hepatitis, portal obstruction, anæmia, and general anasarca are frequent results of the prolonged action of the malarial poison in the valley of the Mississippi.

The remedies best adapted to relieve the distressing and dangerous conditions induced by the prolonged action of the malarial poison may thus be enumerated:

(*a*) Sulphate of quinine, bromide of quinine, valerianate and hydrochlorate of quinine.

(*b*) Arsenic (arsenous acid, Fowler's solution).

(*c*) Iron (the various preparations of iron,—sesquichloride, citrate of iron and quinine, tribasic phosphate of iron, etc.).

(*d*) Mercurials in occasional doses to relieve hepatic congestions and derangements, as blue mass, calomel, bicarbonate of sodium and calomel.

(*e*) Saline purgatives, as bitartrate of potassium, Rochelle salt, sulphate of sodium, and sulphate of magnesium.

(*f*) Diuretics, as juniper-berry tea, nitric ether, jaborandi, pilocarpine, digitalis, etc.

The results are doubtful in those cases in which the liver has been structurally altered by the prolonged action of the malarial poison.

B. Dropsy resulting from valvular disease of the heart, mitral and tricuspid obstructions.

Valvular disease of the heart is attended with more or less hepatic obstruction, and benefit is often experienced by the judicious use of mercurials. Purgatives and diuretics are essential.

The agents used in the treatment of cardiac dropsy may be considered in connection with the following class:

C. Dropsy resulting from various structural alterations of the kidneys, included generally under the head of Bright's disease, acute and chronic nephritis, parenchymatous and inter-

stitial nephritis, gouty and cirrhotic kidney, etc.

In this class of dropsy (C), as with that indicated by B, all portions of the cellular tissue, as well as the abdominal and pleural cavities, may be enormously distended with serous effusions, and the skill of the physician is often taxed to the uttermost to relieve the great embarrassment of the circulation and respiration.

The lesion of the kidneys attended with albuminuria may result from the cardiac lesion, and the latter may also result primarily from the former. In many cases great and immediate benefit may be derived from various purgatives and diuretics.

The following formula may be used in many cases of dropsy arising from cardiac and renal lesions:

℞ Bitartrate of potassium, ℥xvi.

Divide into 16 packages. Add 1 pint of boiling water to 1 package (1 ounce) of bitartrate of potassium and 1 ounce of juniper-berries. Place the juniper-berries (1 ounce) and the bitartrate of potassium (cream of tartar) in a small porcelain pitcher or vessel. Cover the mouth of the vessel with a piece of mosquito-netting or strainer, so as to prevent the juniper-berries from pouring out.

Sig.—Stir well the bitartrate of potassium in juniper-berry tea, and drink a wineglassful every three or four hours, so as to consume the entire pint in twenty four hours.

This mixture will induce both purgation and diuresis, and will in many cases rapidly induce the reduction of the most extensive and obstinate dropsies. The tincture and extract or infusion of digitalis will greatly promote the diuretic action of the juniper-berry tea and cream of tartar.

The writer employs 6 to 10 drops of the tincture of digitalis every three, four, six, or eight hours, with marked benefit in many cases of cardiac and renal dropsies.

It is probable that digitalis is used in too large doses and in a reckless manner, and often with fatal results, by many practitioners.

In some cases the practitioner may resort to various diuretics in addition to digitalis, as jaborandi, pilocarpine, uva ursi, buchu, acetate of potassium, nitrate of potassium, sweet spirits of nitre (nitric ether), and other agents.

Several combinations are beneficial, such as the following diuretic wine for œdema, general anasarca, and dropsy in cardiac and renal diseases.

℞ Fluid extract of jalap, f℥ii;
Fluid extract of squills, f℥iii;
Fluid extract of jaborandi, f℥i;
Fluid extract of digitalis, ♏xxx;
Nitrate of potassium (pulv.) ℥iv;
Angelica wine, Oii. M.

Sig.—One tablespoonful every three hours.

This diuretic and purgative wine has given the most satisfactory results in the speedy and wonderful relief of the most extended dropsical effusions resulting from valvular disease of the heart.

A diuretic mixture similar to that of Fothergill is also useful in dropsy resulting from cardiac disease, as,—

℞ Spirits of chloroform, f℥iv;
Acetate of potassium, ℥iv;
Tincture of digitalis, f℥ii;
Infusion of buchu to make in all f℥x. M.

Sig.—One to two tablespoonfuls every two to four hours.

We have thus presented a few practical observations and suggestions, with the hope that they may prove of practical value.

In the treatment of the dropsical effects of hepatic, portal, cardiac, and renal lesions and obstructions with purgatives and diuretics, the physician should endeavor to sustain the strength of his patients. No fixed rule can be laid down as to the amounts of the various diuretics and purgatives to be used in any given case; each case should be carefully examined and studied, and the effects of each remedy used carefully watched. The results of the treatment will depend largely upon the nature and extent of the organic lesions.

In cases of ascites dependent upon cirrhosis of the liver, much may be accomplished by purgatives and diuretics to prolong life and overcome the constant tendency to the accumulation of serous fluid in the abdominal cavity, and when these measures fail, we must remove the fluid by the trocar.

In many cases of cirrhosis and ascites, caused by excessive spirit (alcoholic) drinking, we have frequently removed by successive tappings hundreds of pounds. Sooner or later these cases of ascites perish from the exhaustion caused by the repeated tappings. In one case of cirrhosis of the liver occurring in an Irish laborer, who had consumed enormous quantities of rum, gin, and whiskey, it was necessary to evacuate the serous fluid from the abdominal cavity almost every seven or twelve days; from one to two gallons of serous fluid were evacuated at each operation. The patient died at the end of the sixth operation. Throughout his illness his intellect was clear.

In ascites resulting from the cirrhotic condition of the liver, death speedily ensues, if the distended abdomen of the patient is not relieved by the trocar.

Under all circumstances, and even in necessarily fatal cases, the physician may accomplish valuable service by relieving suffering and prolonging human life.

THE ACTIONS OF URETHANES.

In an elaborate research, PAUL BINET (*Revue Mèdicale de la Suisse Romande*) has studied the actions of ethylurethane, methylurethane, acetyl-ethylurethane, acetyl-methylurethane, and thio-urea. In regard to the first four bodies, the author has found that the introduction of the radical acetyl (C_2H_3O) in the group NH_2 of the ethers of carbamic acid is followed by no remarkable alteration in the toxic phenomena produced. Again, this radical, being inactive, overpowers the molecule, so to speak, and diminishes its toxicity. For example, in the young white rat, weighing about one hundred grammes, the minimum fatal doses by subcutaneous injection are as follows: Methylurethane, from .40 to .45 gramme; acetyl-methylurethane, from .80 to .85 gramme; ethylurethane, from .20 to .25 gramme; acetyl-ethylurethane, from .50 to .55 gramme. The increasing toxicity, taking 1 as the unit, may be put down in this manner: Acetyl-methylurethane, 1; acetyl-ethylurethane, 1½; methylurethane, 2; acetyl-methylurethane, 4. These figures indicate the relative toxicity among these substances in the case of the rat. Otherwise considered, the acetyl derivatives are about one-half less poisonous than the corresponding urethanes. As to their molecular weight, these bodies may be grouped in an ascending order, as follows: Methylurethane, 75; ethylurethane, 89; acetyl-methylurethane, 117; acetyl-ethylurethane, 131. The toxicity does not, therefore, increase in relation to the molecular weight when looked upon in the arrangement just described, but it does increase in relation to the molecular weight when the urethanes and their acetyl derivatives are considered separately. Thus, for instance, ethylurethane possesses at the same time a greater toxicity and a greater molecular weight than methylurethane; similarly, the acetyl derivative of ethylurethane possesses a greater toxicity and a greater molecular weight than acetyl-methylurethane. On the other hand, the acetyl derivative of ethylurethane, although it has a greater molecular weight, is less toxic than ethylurethane; the same may be said in regard to acetyl-methylurethane and methylurethane.

The author has also endeavored to determine whether the toxicity of the molecule itself is in any way modified by the introduction of the acetyl radical. Dividing the toxic doses by the respective molecular weight, the following figures were obtained, indicating the relative proportion of molecules contained in each dose: Acetyl-methylurethane, 7; methylurethane, 5½; acetyl-ethylurethane, 4; ethylurethane, 2½. Now, taking 1 as the unit of toxicity for acetyl-methylurethane, the following are the relative molecular toxicities for these different bodies: Acetyl-methylurethane, 1; methylurethane, 1½; acetyl-ethylurethane, 2; ethylurethane, 3. In other words, the molecule of acetyl-ethylurethane is twice as toxic as that of acetyl-methylurethane; that of ethylurethane three times as toxic, and so on.

The author proposes to term *molecular toxicity* the relative toxicity of bodies with regard to the numerical proportion in the number of molecules contained in the toxic doses. It is obtained by dividing the toxic dose by the corresponding molecular weight of the body. The molecular toxicity of the urethanes is expressed thus: The molecule of ethylurethane is twice as toxic as that of methylurethane; similarly, the molecule of acetyl-ethylurethane is nearly twice as toxic as that of acetyl-methylurethane. The relative toxic powers of the urethane are not, therefore, notably altered by the introduction of the acetyl radical. The introduction of this radical in the group NH_2 of the urethanes diminishes the toxicity of the molecule; the loss is about a third. Thus, the relative molecular toxicity of acetyl-ethylurethane being represented by 2, that of ethylurethane is represented by 3, a difference of one-third. Similarly, the molecular toxicity of acetyl-methylurethane being 1, that of methylurethane is 1½, a difference of one-third.

The preceding results were obtained in albino rats; similar results were observed in other animals, with slight differences. The rabbit and the rat are more susceptible to the action of urethanes than the dog. Both the rabbit and the rat exhibit more or less the same susceptibility to the influence of urethanes. Thus, for the rabbit the urethanes show a toxicity similar to that seen in the rat, the toxic doses being practically the same. This is shown by the following figures, obtained for every one hundred grammes of the animal's weight: Acetyl-methylurethane, .50, toxicity, 1; acetyl-ethylurethane, .40, toxicity, 1⅓; methylurethane, .25, toxicity, 2; ethylurethane, .12, toxicity, 4. Therapeutically considered, the acetyl derivatives of the urethanes, being less active, appear to be more advantageous than the corresponding urethanes.

From the results of this investigation the author draws the following general conclusions:

1. The first bodies of the series of urethanes are more active proportionately to the increase

in molecular weight of the combined alcoholic radical.

2. The acetyl radical introduced in the group NH_2 of the urethanes does not notably modify the physiological properties of the molecule, but diminishes the toxicity of this by an equivalent weight. For the rat and the rabbit the relative toxicities, in an ascending order, are as follows: Acetyl-methylurethane, 1; acetyl-ethylurethane, 1½; methylurethane, 2; ethylurethane, 4.

3. The term *molecular toxicity* is applied to the relative toxicity determined by the quotients of the toxic doses divided by the molecular weights. Such toxicity is diminished by the introduction of the radical acetyl in the group NH_2 of the urethanes.

4. The physiological action of the urethanes, like that of their acetyl derivatives, consists essentially in a narcosis of the central nervous system, during which the great functions are not interfered with. Under toxic doses the animal succumbs from collapse, with progressive relaxation and weakness of the heart.

THE TREATMENT OF SMALL-POX BY MERCURIAL BATHS AND INUNCTIONS.

R. RICHARDIÈRE (*L'Union Médicale*) publishes an interesting report of the cases of small-pox occurring at the Hospital d'Aubervilliers from February 15 to the end of December, 1892. There were in all one hundred and ninety-seven cases,—one hundred and five of true variola and ninety-two of varioloid. Out of the one hundred and ninety-seven patients, fifteen died, giving a mortality of 7.5 per hundred. Of eighty patients subjected to the antiseptic treatment, only ten died, a result which may be considered good, since in most of these cases the disease assumed the gravest character. The cause of death in these ten cases was adynamia in five of the confluent variety of the disease, diffusive suppuration of the neck and broncho-pneumonia in one each, diffusive gangrene of the lungs in an alcoholic, hemorrhages in an advanced tubercular patient, and uræmia in one case of infectious nephritis. Among the complications which occurred in the non-fatal cases are mentioned: Unilateral epididymitis (non-suppurative), 1; more or less intense pulmonary congestion, 4; broncho-pneumonia, 2; dry pericarditis, 1; phlegmasia alba dolens during convalescence, 2; bed-sores. 1. The majority of patients made a good recovery, without presenting during the period of convalescence such complications as furunculosis, ecthyma, or multiple superficial abscesses, so frequent before the antiseptic treatment of small-pox was instituted. Erysipelas was *never* observed. As intimated, suppurations during convalescence were exceedingly rare, occurring only twelve times in the one hundred and ninety-seven cases of small-pox observed, and of these twelve, seven cases belonged to varioloid patients or those in whom the mercurial bath was not applied. On the whole, the treatment has given satisfactory results. It consists simply in the application of mercurial baths and inunctions. The patients are bathed twice a day at regular intervals. The bath must have an ordinary temperature,—that is, from 33° to 35° C.,—and must be of a duration of fifteen minutes. Each bath must contain ten grammes of corrosive sublimate dissolved in alcohol. These baths are given twice a day up to the time when the bodily temperature has declined definitely, or just up to the end of the suppurative stage of the malady. During the period of desiccation one bath every twenty-four hours is sufficient. After the crusts begin to fall off, the mercurial is substituted by a simple bath containing some boric acid in solution. The mercurial baths act upon the pustules of the trunk and extremities, but not upon those of the face. The latter are best treated, according to the author, by the following method: The head and face of the patient are covered by muslin bandages that have been previously dipped in a solution of corrosive sublimate of the strength of fifty centigrammes to the litre. A sort of helmet or casque is formed with this bandaging, leaving intact, of course, the natural openings, such as the eyes, nose, and mouth. The bandage is allowed to remain during the course of the disease, and after its first application is simply wetted several times a day with the mercurial solution, without removing it. This method is of great value and is well borne by the patients. The author affirms that cases of small-pox treated in this manner do not exhibit any form of dermatitis or vesicular eruptions following often the local application of mercury. In the cases reported a milk diet was strictly observed; ordinary diet was only allowed two or three days after the bodily temperature had assumed a normal character. No remedial agent was administered internally, and only in adynamic cases was stimulation resorted to.

THE ANTIPYRETIC ACTION OF GUAIACOL WHEN LOCALLY APPLIED.

This subject, first, we believe, brought to the notice of the profession by an article of Bard,

and of which we published an abstract in a recent number of the GAZETTE, receives support in the results obtained in three tubercular cases reported by E. ROBILLIARD (*Gazette Médicale de Paris*).

The author concludes as follows:

1. The local application of guaiacol diminishes the temperature more rapidly and constantly than the sulphate of quinine. This reduction is considerable, consisting of several degrees.

2. The part of the cutaneous surface selected, like the extent of it, is of no importance. The drug has been applied over the chest, on the arms, and over the thighs, without observing any difference in the results.

3. The dose of guaiacol employed may vary, but it seems that the application of .50 gramme is sufficient to produce excellent effect. I believe that the question of purity of the drug is of the greatest importance. I have made applications with an impure guaiacol, resulting in the production of an intense burning and redness over the skin.

4. Patients favor the medicament under consideration. They soon feel the good effects. All those that I have observed have exhibited a considerable increase in the perspiration and a marked taste of guaiacol in the mouth. The secretion of urine is apt to be abundant. I have searched for the presence of guaiacol in the urine, but the results have been negative. However, it is sufficiently demonstrated that the medicament is absorbed from the skin. The taste of the guaiacol appearing in the mouth of patients cannot be attributed to the introduction of the drug by the breathed air, since care has been exercised in covering the applications with impermeable court-plaster and a good bandaging. That the antipyretic effects of the drug are not due to the imagination is evident from the fact that I have made applications with water colored with carmine, and no reduction of the temperature has been noticed in these instances.

THE SEDATIVE ACTION OF DUBOISINE, WHEN GIVEN IN CONTINUED DOSES, IN THE TREATMENT OF THE INSANE.

Under the above title, E. MARANDON MONTYEL (*Archiv. de Neurologie*) publishes interesting details of thirty-five cases of mental derangement treated by duboisine.

From the results obtained the author formulates the following conclusions:

1. Duboisine is a marvellous sedative, capable of allaying always and in all cases lypemania and maniacal excitement, whether of a vesanic or of a paralytic nature, and of producing an absolute calmness in excitable or the most violent cases. The action of the drug is always effective and manifests itself in two phases,—the one an incomplete attenuation of the excitement; the other a complete one, characterized by a total disappearance of the pathological condition, and which lasts for a more or less lengthy period of time.

2. The sedation caused by duboisine is not always of the same intensity; generally, it does not come on until the second day, sometimes not until the third day after the administration of the drug.

3. Once produced, the sedation of the drug is maintained steadily, provided a habit is not made manifest; exceptionally, good and bad days alternate.

4. The action, even when complete, often persists one or two days after the ingestion of the drug has been stopped, and sometimes longer.

5. In the intermittent or remittent forms duboisine is capable of reducing the duration of the crises and of prolonging the intervals between them.

6. The sedative action of duboisine, particularly during the first days of its administration, is generally in inverse ratio to the time which has elapsed after the ingestion of the remedy, and hence the advantage of giving the daily amount of the medicament in two doses.

7. The action of duboisine is more frequently complete in chronic than in acute mania; and, on the contrary, more so in acute than in chronic lypemania.

8. In general paralysis the complete action of duboisine is less frequent than in chronic mania or acute lypemania, but more so than in acute mania or chronic lypemania; and, similarly, more frequent than in mania or lypemania in general; so that, in a total of cases of general paralysis, the sedative influence of the drug was more marked in these than in those cases of a vesanic nature.

9. The organism of the class of patients here considered becomes often and quickly accustomed to the influence of duboisine, and this habit—which, as a rule, is established abruptly—once produced, rebels, ordinarily, to increased doses of the drug; this is true particularly in regard to the production of complete sedation.

10. The duboisine habit occurs more frequently and more rapidly in cases of general paralysis than in those of a vesanic nature, or

of acute and chronic mania and chronic lypemania; it is the same in general paralysis as in acute lypemania, and of more frequent occurrence in lypemania than in mania; finally, it does not come on in chronic vesanic cases.

11. The incomplete action of duboisine is less frequent in general paralysis than in vesania, but more frequent than in chronic mania and acute lypemania; it is less frequent in mania than in lypemania, in chronic than in acute mania, in acute than in chronic lypemania.

12. In general terms, it may be said that duboisine is more active in cases of general paralysis than in vesanic cases, in mania than in lypemania, in chronic than in acute mania, and, *vice versa*, in acute than in chronic lypemania.

13. Owing to the influence which duboisine exercises on the stomach, it is better to administer the drug, in order to obtain a sedative effect, during the day and as long after each of the two principal meals as possible.

14. Unfortunately, duboisine acts in a deleterious manner on the process of nutrition, especially when given for a long time. This action is to be feared, and, notwithstanding the marvellous sedative properties of the drug, is a drawback to its employment, particularly when the use of the medicament is to be prolonged.

THE VALUE OF ANTISEPSIS IN THE TREATMENT OF HEPATIC COLIC AND BILIARY LITHIASIS.

An interesting article is published by E. Cassaet and L. Cornet (*Archiv. Cliniques de Bordeaux*), containing the details of two cases of the nature referred to above, in which happy results were obtained by antiseptic treatment. In Case I. all the troublesome symptoms of biliary retention yielded to the action of salicylate of sodium combined with large doses of olive oil, by the elimination of a very large calculus. The dose of the salt was 5 grammes during a period of twelve days, followed by the ingestion of 300 grammes of olive oil in six doses, at intervals of half an hour, for three days. In Case II. the same symptoms disappeared under the use of large quantities of corrosive sublimate. The first dose of 30 grammes of Van Sweiten's liquid, in two equal amounts, morning and evening, was given. A second dose of 50 grammes was then administered, divided in three equal parts, at intervals of several hours, the patient taking in the mean time large quantities of milk. A third dose of 100 grammes, in four equal amounts, during the day, was ingested, associated with the administration of 300 grammes of milk. The most important result in both cases was the rapid disappearance of the infectious symptoms attending the migration of the calculi. The authors entertain the hope that the use of the salicylate of sodium in long-continued doses, and that of corrosive sublimate in massive amounts, if necessary, may in every case abate the serious phenomena of angiocholitis and post-calcular cholecystitis, not only by preventing the formation of new calculi, but also by provoking the expulsion of those already in existence.

THE INJECTIONS OF NERVE-SUBSTANCE IN THE TREATMENT OF THE INSANE.

A. Cullerre (*Gazette Méd. de Paris*) publishes the details of fourteen new observations with the use of nerve-substance in the treatment of insane patients. The author summarizes his experience as follows: The injections of nerve-substance, practised aseptically, are inoffensive. They have the property of increasing nervous power, especially that presiding over nutritive functions. They are, therefore, useful in the treatment of mental derangement. The first effect of this mode of treatment of the insane is the amelioration of the appetite. Certain patients, particularly those subjects of a more or less prolonged abstinence, show an almost bulimic disposition, their appetite becoming insatiable. The bodily weight increases in a short time and often to a considerable extent. Muscular power is renewed; the organic functions become regular; menstruation reappears; uterine hemorrhages disappear, as do the neuralgias accompanying them. The cachectic state, when not the result of an organic affection, such as nephritis, cancer, etc., is not a contraindication to the employment of the injections, and, on the contrary, these are of service. Tubercular patients are sometimes benefited by them. This medication appears to be efficacious in the course of certain acute maladies, when the usual modes of treatment have proved of no avail, and when an unfavorable prognosis authorizes the use of bold therapeutic means. But, notwithstanding all these merits, the injections of nerve-substance have failed to strengthen the hopes we had entertained after the happy results obtained in the treatment of neurasthenia. *They are impotent against the psychopathic element itself.* The mental state, in curable cases, is only slightly influenced by the injections of gray substance, and sometimes only ameliorated for the time being, during the

few hours immediately following such injections; but this effect (with the exception, perhaps, of a single case, not fully demonstrated at that) does not persist, and no lasting amelioration is obtained.

TREATMENT OF PERFORATED GASTRIC ULCER.

Naturally the most disastrous accident which can occur to the patient suffering from gastric ulcer is perforation, and the results are more to be dreaded than acute hemorrhage. In the *Birmingham Medical Review*, MR. BARLING contributes a paper on this subject.

The record of his three cases is so instructive that they will bear careful inspection. They emphasize many points. First of all, that a patient may die of perforation without anything in the previous history to suggest the presence of an ulcer of the stomach, —that is, the ulcer is latent. In two cases the history points to a period of quiescence in the symptoms for some time before perforation took place. Then it will be noticed that in the first two cases the perforating ulcer was on the anterior wall of the stomach,—a point of some importance in the treatment, because here the ulcer will often be accessible for suturing. The general impression appears to be that most of the perforations are to be found on the posterior wall, or, at all events, not on the anterior; but it is to be doubted if this would be borne out by statistics. Again, these three cases indicate the class of patients most subject to the accident of perforation; all of them were young women and all taken from the same social class.

One of the most important points they illustrate, however, is that cases of perforation may vary greatly in acuteness and intensity. Nothing could well be more acute or intense than the peritonitis found in Case I., in which the abdomen was opened six hours after the perforation had taken place. In Case II., on the contrary, the escaped stomach-contents were evidently circumscribed for a time between the liver and the stomach, and the peritonitis was of a milder degree and more limited in area, so much so that perforation was hardly suspected by those who first saw the patient. In the third case the escape of stomach contents was so limited that the peritonitis was quite mild, and subsided almost entirely until the twentieth day, when the acute symptoms developed.

The fact should be emphasized that though some patients die almost outright from the shock of perforation, and a majority in from twenty-four to thirty-six hours from an intense peritonitis, yet in a few cases the symptoms are subacute, or even subside for a time, to be followed by an acute extension which will prove rapidly fatal.

What is the fate of a patient with an ulcer of the stomach which has perforated, if surgical measures are not resorted to? Available statistics do not show, but from a careful scrutiny of numerous cases the mortality is not exaggerated in giving ninety-five per cent. or greater. In medical literature every now and then one comes across a case of recovery recorded, and though not all of these are conclusive, yet there are sufficient cases submitted to autopsy to demonstrate the possibility of recovery by the ordinary treatment for peritonitis and keeping the stomach empty. It is necessary to realize the fearful mortality of perforation, because failure will often follow on surgical interference, and it may excite regret that the disease was not treated by medical means only. The right way to view the matter is to regard each patient who recovers after operation as one saved from almost certain death.

Before speaking of treatment it is advisable to see what it is we may be called on to treat. From a scrutiny of numerous cases it is clear that we may have at least three conditions present,—1, a very acute and widely-spread peritonitis; 2, a circumscribed peritonitis, which may or may not eventually become diffused; 3, a circumscribed peritonitis which is mild in its commencement, which eventually suppurates and gives rise either to an acute and fatal peritonitis or perforates into an adjacent cavity, as the thorax or colon. The diagnosis of perforation of the stomach is, as a rule, not difficult. The patient is commonly a young woman, oftenest of the servant class, or an elderly male. There is very generally a history of indigestion, which has given rise to the suspicion of gastric ulcer even if a positive diagnosis has not been made, but the symptoms may have been in abeyance for a time before perforation takes place. The symptoms of perforation are generally unmistakable. The patient complains of intense or, at all events, of very severe pain in the abdomen, this generally after a full meal or after making some exertion. The pain is wide-spread, and collapse sometimes of a profound character follows. The pain may later be localized to the upper part of the abdomen or to the left hypochondrium. Vomiting sets in, the pulse is quick and small, the belly becomes rigid and tender. Then we have the usual phenomena of a very

acute peritonitis if the patient survive the immediate shock,—abdominal distention, rapid breathing and pulse, pinched facial look, lividity of the lips and extremities. An occasional sign which has been made much of is the diminution—in some cases the disappearance—of liver dulness, which may be due either to the presence of free gas in the peritoneal cavity, from the stomach, or to a distended coil of bowel getting in front of the liver.

A diagnosis, then, can usually be made; but occasionally the progress of the case appears to throw doubt upon it. This was so in the third case; and, curiously enough, a somewhat similar case occurred in an adjacent house, in which perforation was diagnosed. A girl with symptoms of gastric ulcer was, after a period of quiescence, seized with extreme pain in the abdomen, collapse, tenderness on pressure, and vomiting. With morphine and complete rest for the stomach, the symptoms so completely subsided that the diagnosis was much doubted; but the following day an attack of retching brought on a further leakage from the stomach, and the patient speedily died, the conditions mentioned being substantiated by autopsy.

A diagnosis of perforation having been made, operation should follow as speedily upon it as circumstances will allow. It is not possible to tell in the early hours whether the escape of stomach contents is much or little, whether the perforation is on the anterior or posterior wall of the stomach, or whether there is any probability of the extravasated food, etc., becoming localized. Under these circumstances, and recognizing the terrible mortality of perforation, it seems to be clear that *early operation* is urgently called for always when perforation has been diagnosed.

Operation.—With the limited experience at present available, it is undesirable that one should speak too dogmatically as to the exact lines to be followed, but the following are the main outlines. The abdomen should be opened in the middle line above the umbilicus, but not too near the costal margin. Positive evidence may at once be found of perforation in the presence of free gas or food. The area between the stomach and liver should be examined with care, so that any localized collection here should, if possible, be prevented from soiling the more distant parts of the cavity. Any extravasated matter having been removed, the perforation should be sought for on the anterior wall, especially towards the lesser curvature, where it will most commonly be found to exist. A perforation being found here, if accessible, should be sutured, the sutures being applied with the stomach outside the peritoneal cavity, if this can be managed; but it will not always be possible. It will be wise to first pass a piece of drainage-tube into the hole in the stomach and run off any fluid the organ contains. In my second case, although no food had been administered for some time by the mouth, there were several ounces of thin, almost watery, fluid in the stomach, just like the material so constantly vomited in peritonitis, and which kept leaking from the perforation until it was completely removed by the tube. The most convenient form of suture to use is probably Lembert's; but if the hole to be closed cannot be brought outside the abdomen, the operator will find that he has a difficult task before him. It has been recommended that the edge of the ulcer should be pared before suturing. This was not necessary in the only one the author has sutured, for the edges of the ulcer were so tough as to hold the sutures well. If it were found that the edge was too friable, excision of it might be advisable; but even then the case would perhaps be met better by an extensive infolding of the margin, which could be done easily and without risk of kinking in the stomach. The objection to excising the margin is that it takes time to effect, and one of the most important factors militating against recovery in cases of this kind is prolonged exposure on the operating-table. If the ulcer cannot be sutured, it may possibly be stitched to the lower angle of the abdominal incision. If the perforation be inaccessible for suturing and cannot be brought up to the incision, the only resource left to the surgeon is drainage with a tube leading directly to the point of leakage. Though this falls short of the more complete proceeding, yet drainage has been found so efficient a protection against the extravasation of other fluids—as, for instance, bile—that one cannot but feel hopeful of it in this condition. Whether suturing be possible or not, it is of the greatest importance that the abdominal cavity should be washed out and thoroughly flushed with hot water. When the flushing out has been done, the drain should be placed *in situ* close to the perforation, whether it has been sutured or not. Something more than this is necessary, however. A second tube should be inserted into the abdomen just above the pubes, otherwise the drainage of the peritoneal cavity will be very imperfect, and a considerable quantity of fluid will collect in the pelvis and greatly interfere with a successful issue. It is probable that this accumulation interfered with the well-doing of the second case.

In the more chronic cases, such as the third,

the treatment should be different. An incision directly on to any inflammatory mass would be the right procedure, and in the event of pus or other fluid being found, this should be evacuated with the greatest care, to prevent fouling of the general peritoneal cavity. For this reason sponging is to be preferred to flushing for cleansing purposes, as the irrigation may carry infective particles to more distant parts, whence they cannot escape again, but may set up fresh mischief. A drain to the bottom of the abscess cavity is then required, and all that can wisely be done has been done. To search for the perforation, with a view to closing it, would be useless and dangerous.

Finally, for success two things are necessary,—*early diagnosis* by those who first see the case, and *operation* following on this as early as possible. Here hours are of as much importance as days in other conditions; in fact, there is hardly any emergency more urgent in the whole of surgery.

DEATH FROM NITROUS-OXIDE GAS.

Death from inhalation of nitrous-oxide gas is so unusual that any case should be reported and studied with interest. In the *Medical News*, THORNBURY reports such an accident.

Following some preliminary remarks regarding the effects of nitrous oxide, the following brief report is made of an autopsy in this particular case. The autopsy was held upon a woman who died after the administration of four gallons of nitrous-oxide gas by a dentist for the extraction of four teeth. Soon after the induction of anæsthesia the patient began to show signs of embarrassed breathing. Medical consultants were summoned. The pulse became rapid and attempts at breathing spasmodic. Artificial respiration was resorted to; the lower extremities were elevated. Nitro-glycerin ($\frac{1}{100}$ grain) was administered hypodermically, and ammonia applied to the nostrils. The patient seemed to rally for a short time, but unconsciousness continued, the pulse became more rapid and feeble, and the heart's action finally ceased.

The body was that of a middle-aged female, fairly developed and poorly nourished. Post-mortem rigidity was slight. Post-mortem staining was present over the pendent portions of the body. The median incision showed the subcutaneous fat to be small in amount. No pleuritic adhesions existed in the thorax. The right lung weighed sixteen ounces, and was universally congested and œdematous; there was exudation of a large quantity of frothy serum. The left lung weighed thirteen and a half ounces, and was also congested and œdematous. The lining membrane of the bronchi upon both sides were intensely hyperæmic and the tubes partially filled with frothy exudate. The heart weighed ten ounces, and was of normal size and color. The ventricles were firmly contracted, and the walls of the left ventricle were slightly thickened. There was a dark clot in the chorda of the mitral valve. There were three minute atheromatous areas in the posterior wall of the aorta just above the segments of the valve. Over the anterior surface of the œsophagus were two areas of hemorrhagic extravasation, irregular in outline and about the size of a half-dollar. The tracheal mucosa was heavily coated by a frothy, removable mucus.

The larynx was congested, and the lining membrane was also covered with frothy, slightly blood-tinged mucus. The congestion was especially marked in and just below the ventricles. The aryteno-epiglottidean folds were considerably corrugated, suggesting pre-existing œdema. The position of the viscera was normal. The spleen was dark, moderately firm, normal in size and in consistency. The kidneys showed a dark-bluish discoloration; the surface was smooth, the capsule non-adherent. The right was slightly smaller than the left, and contained a blood-clot beneath the mucosa of the pelvis and the true renal substance. This clot occupied an area one-half a square decimetre in extent. The ureters were normal and the bladder empty. No urine was obtained for analysis. The liver was normal in size; its weight three pounds. The stomach was normal in size and contained about six ounces of partially-digested food. The mucous membrane was coated with thick, semi-tenacious mucus; the membrane was slightly slate-colored in appearance. The intestines were normal. The uterus showed catarrhal endometritis, and there was a small quantity of mucus in its cavity. The left ovary showed a very recent corpus luteum and there was also a small cyst present. The right ovary and the tubes were normal. The brain was not examined, owing to inability to obtain the consent of the coroner.

This case illustrates the invariable presence of danger in the administration of anæsthetics, even of the supposed harmless "laughing gas."

TREATMENT OF DIABETIC COMA.

In the London *Lancet*, HARLEY contributes a valuable paper on diabetic coma, and concludes as follows:

• The rational treatment founded on the re-

sults obtained from the above-mentioned experiments is to administer alkalies. If the symptoms are urgent and time is of moment, sodium carbonate might be administered subcutaneously or intravenously, as recommended by Stabelmann, the pulse being carefully watched in case of heart-failure. At the same time, since the author's experiments have shown so great a diminution in the oxygen absorbed, it is advisable to encourage oxidation. The inhalation of pure oxygen may help, as well as trying to improve oxidation by massage. Diuretics, together with large quantities of fluids, will be of value in increasing the rapidity of the elimination of the toxic products derived from the sugar. These are the means suggested to ward off attacks of diabetic coma, or even to diminish the severity of a coma already set in.

INTRACEREBRAL HEMORRHAGE.

ESKRIDGE contributes a paper on this subject to the *Medical News*. He thinks that most patients while in the apoplectic state from cerebral hemorrhage would do better without medicine than they do when medicine is simply administered with the hope of doing some good, but the administration of which is not governed by any logical or rational principle.

If we bear in mind that in hemorrhage into the cerebral substance, not traumatic in character, the immediate cause of the hemorrhage is the bursting of a miliary aneurism, we shall appreciate how futile must be our efforts to arrest such a hemorrhage by the administration of medicine. Immediately after the occurrence of the event the indications are to allow the effused blood to coagulate, to promote the flow of the venous blood from the head, to quiet the heart's action, to allay the restlessness of the patient, when such exists, and to prevent an undue amount of blood being carried to the head. We can render the best service in aiding the coagulation of the effused blood by keeping the patient absolutely quiet. The flow of the venous blood is promoted by slightly elevating the head and shoulders, and not allowing the head to be bent forward, and thus compressing the veins of the neck. The heart's action is best quieted by the careful administration of small and frequently-repeated doses of aconite, when there are no contraindications to the use of this drug. Restlessness, when considerable, is most effectually relieved by a hypodermic administration of ¼ grain of morphine; when it is slight, sodium bromide is effectual. Various means are at our command to lessen the flow of blood to the head; sometimes one or two, sometimes all, should be employed. Brisk purgation should almost always be resorted to. If the stomach is not irritable, one drop of croton oil in ten drops of sweet oil should be placed on the tongue every hour until the bowels are opened freely. When the stomach is irritable, ten grains of calomel should replace the croton oil. Whether calomel or croton oil is employed, an enema, consisting of one ounce of salts, a half-ounce of glycerin, and four ounces of water, should be thrown up the large bowel as soon as possible after the occurrence of the hemorrhage. Mustard-plasters applied to the back of the neck, the front of the chest, and on the calves of the legs aid in lessening the quantity of blood carried to the head. Bloodletting is sometimes indicated, but cases necessitating the withdrawal of blood by opening a vein are probably rare.

In regard to the administration of ergot in the cases of cerebral hemorrhage under discussion, it does no good whatever, and there is a possibility of its doing harm. The practice of applying cold to the head, especially ice, in cases of non-traumatic, intracerebral hemorrhage is reprehensible. It seems rational to suppose that it may increase the engorgement of the intracerebral vessels. When the face is turgid, the head warm, and the carotids throbbing, ice-cloths or iced poultices may reduce the heat of the head and promote the coagulation of the effused blood.

It will be seen that the only routine treatment recommended for intracerebral hemorrhage is brisk purgation immediately after the occurrence of the accident, to which may be added the application of mustard-plasters to various portions of the body. In the subsequent treatment, during the acute stage, indications must be met as they arise. In the chronic stage, electricity and strychnine must be used with judgment and great caution. The routine employment of these two agents to overcome the paralysis does much harm by causing irremovable contractures of the arm and leg of the affected side. In this stage strychnine should not be employed when contractures are present or when the deep reflexes are greatly exaggerated. We must remember that no hard-and-fast rules can be laid down in regard to the use of strychnine. The author has seen cases in the acute stage in which this drug, in combination with aromatic spirit of ammonia, has done good service. When electricity is applied,—and, as a rule, it should not

be before the end of the fourth or sixth week,—the extensor muscles only should be stimulated, and during the application the extremities should be held in their normal positions. Massage, systematic exercise, Swedish movements, and time do most to overcome the residual paralysis of intracerebral hemorrhage.

THE TREATMENT OF CHOREA.

For a number of years, ESKRIDGE, of Denver, has refused to assume charge of a case of chorea if the parents and friends will not consent to follow his instructions. In the very mildest cases, in which there is only an occasional grimace of the face or an infrequent twitch of the muscles of the hand or foot, he allows the patient to sit up part of the day and spend the remainder of the waking hours on a lounge. No violent or exciting exercise, such as romping, running, etc., is allowed. The patient is placed on a nutritious, digestible, but non-stimulating diet. The stomach and bowels are kept in as good a condition as possible. The patient, to begin with, receives as many grains of antipyrin at bedtime as he is years old, and the dose is increased one grain each night until all twitching stops. At the beginning of the treatment of these mild cases he commences with 1 drop of Fowler's solution after each meal, and increases the dose one drop each day until the point of tolerance is reached; then the arsenic is discontinued for two or three days, or until all unpleasant effects of its administration have passed away, when the drug is again resumed at the dose reached when it was stopped. The dose is again increased one drop each day until tolerance is reached, when it is discontinued, and resumed after two or three days as before. As soon as the twitching ceases, the antipyrin at bedtime is discontinued, and the patient is given syrup of the iodide of iron after each meal, in from 3- to 10-drop doses, depending upon the age of the patient. The arsenic and iron are continued for two or three weeks after all symptoms of the disease have disappeared and the patient has regained considerable flesh.

In all except the mildest cases, to which reference has just been made, absolute rest in bed, day and night, is insisted upon from the first. If he had to rely upon one method of treatment in the management of chorea, to the exclusion of all others, he should unhesitatingly choose absolute rest in bed. When the little patient is placed in bed to begin its treatment (we will suppose it to be a child of a few years, or not more than fifteen years of age), he orders as many grains of antipyrin three times daily, after taking food, as the child is years old, and increases the dose one grain each day until all violent movements stop, when he begins with 1 drop of Fowler's solution after each meal, well diluted in water, and increases the dose one drop each day, in the manner described. About the second or third day after the arsenical treatment has been added, the antipyrin is given only once each twenty-four hours, and the time for its administration is usually about eight or nine o'clock in the evening, thus securing a comfortable night for the little patient. After all but the most occasional twitching has stopped, the antipyrin is discontinued, and syrup of the iodide of iron is given in connection with arsenic. It seems a little heroic to give a child of seven years of age from 10 to 15 grains of antipyrin three times daily, yet he has given a child of eight years 20 grains of antipyrin three times daily, without the slightest apparent depression or untoward effect. Certain precautions, however, are necessary. In the first place, if there is any rise of temperature, perspiration will be free and depression will result. Antipyrin should be avoided in cases in which there is much rise of temperature. In such chloral hydrate takes the place of antipyrin. He has never carried the dose of the former to nearly that of the latter. When there is cardiac weakness, antipyrin and chloral should be given with great care, if at all. When such a complication exists, phenacetin, with a little cannabis indica, seems to quiet the patient. Valvular disease of the heart alone does not seem to contraindicate the employment of antipyrin, but cardiac dilatation does.

While antipyrin is being given the patient must be kept at rest in bed. He has seen considerable depression follow a large dose of antipyrin when the little patient has been allowed to run around. During the administration of large doses of antipyrin or chloral the patient should be seen at least daily, and the urine should be repeatedly examined.

The questions in regard to arsenic in chorea —How large doses may be given? How long should the drug be continued? Should it be kept at the point of tolerance for weeks without intermission, and what unpleasant effects are likely to follow its administration in large doses? —are pertinent.

How large doses of Fowler's solution may be given? As a rule, children from seven to fifteen years of age will bear larger doses of arsenic than adults. So far he has never found

it necessary to give very large doses to children under six years. In a number of instances he has given 20 drops of Fowler's solution three times daily to children from ten to fifteen years old, for a week or more at a time. In the majority of instances the point of tolerance is first reached when the dose has been gradually increased to some 6 or 7 drops thrice daily. After stopping the arsenic for two or three days, or until all unpleasant effects have passed away, and resuming its administration at 6- or 7-drop doses, as the case may be, the next point of tolerance will be attained when the dose has reached 10 or 12 drops thrice daily. In most instances all twitching will have stopped at this time. If such be the case, the medicine is resumed after two or three days, at this dose, but now it should not be increased. It should be given at the dose tolerated when the twitching has stopped, for a week or ten days, then discontinued for two or three days, and resumed again at the full dose. The dose is now lessened one drop each day until 4-drop or 5-drop doses are reached, stopped again for two or three days, and again resumed at 5-drop doses. Arsenic, as a rule, should not be continuously given in full doses for more than eight to ten days at a time. By observing this precaution he has been fortunate enough to avoid the ill effects that some physicians have reported from the continuous use of full doses of arsenic.

How long should the administration of arsenic be continued after all twitching has stopped? As a rule, it should be continued for a month or more after all choreic symptoms have ceased, but not in full doses of toleration for more than a week or ten days, when it should be stopped for a few days; then the dose should be gradually reduced, as recommended.

The next question—Should the large tolerated doses be continued for weeks without intermission?—has already been answered in the negative.—*Medical News.*

REMOVAL OF HAIR, MOLES, ETC., BY ELECTROLYSIS.

In the *Medical News*, SORENSON contributes an interesting paper on electrolysis, and reaches the following conclusions:

1. Do not begin with too strong a current.
2. Apply the current for a sufficient length of time.
3. Always apply the negative pole to the part it is desired to destroy.
4. Do not have the circuit closed when you insert the needle, until you have learned to know your patient *electrically*, if such use of the word be permissible.
5. Always test the strength of your current before beginning. To do this it is convenient to touch the two poles to the tongue, having the points about an inch apart.

LOCAL ANÆSTHESIA BY ETHYL CHLORIDE.

GIBSON contributes to the *New York Medical Journal* a paper on ethyl chloride.

Ethyl chloride is one of the newest local anæsthetics. Gibson's experience leads him to believe that it is destined to occupy a useful place among our local therapeutic agents.

There are several preparations made by various firms, and, so far as the author has observed, of equal merit. The preparation the writer uses is that made by Dr. Bengue, of Paris. Its properties are thus described by the maker: "Ethyl chloride is a colorless liquid, with a slight ethereal odor of an agreeable character. The density is .874 at 41° F.; it boils at 52° F.; its vapor density is 2.219. Ethyl chloride is very inflammable, burning with a green-edged flame and setting free hydrochloric acid."

The anæsthetic comes in glass bulbs of the capacity of a little over an ounce. The bulbs are provided with a capillary orifice, upon which a tightly-fitting cap is screwed, preventing evaporation. One bulb furnishes sufficient anæsthesia for six to eight minor procedures. In using this agent the cap is first unscrewed and the bulb held in the palm of the hand, when the liquid will be instantly volatilized by the heat of the body. The bulb should be held horizontally and six to eight inches from the part, playing the stream back and forth as evaporation is produced. At first a hyperæmia results, then pallor, and gradually the part assumes a parchment-like appearance. From one to two minutes is needed, and anæsthesia lasts as long again.

Gibson's experience with ethyl chloride comprises some twenty-five cases of minor surgery, chiefly cellulitis of the fingers, abscesses of the jaw, buboes, sinuses, boils, and carbuncles. Most of the cases were relieved by a single incision, and in such the anæsthesia was most satisfactory. Where more extensive procedures were demanded, where deeper structures were divided, for efficient curetting, etc., the agent was seldom efficient.

Its action in certain cases, however, was ideal. In felons, for instance, the single rapid

incision was generally effected absolutely without pain. Every one that is called upon to incise felons knows how excruciating the pain is. The patient winces at the slightest touch; the introduction of cocaine solutions subcutaneously is almost a cruelty, as intense pain results both from the needle pricks and from increase of the tension in the indurated tissues. Moreover, the cocaine often proves powerless to overcome the aggravated conditions. It is especially in such conditions that chloride of ethyl will prove invaluable.

No attempts to use ethyl chloride were made in procedures requiring more than a few seconds' time, nor where careful dissection was needed, as the agent so changes the character of the tissues. It can, however, be employed to great advantage in removing small sections of tumors for microscopical examination.

It will occasionally be found useful to combine the action of the new agent with that of cocaine.

The author had recently to operate for ingrowing toe-nail on a young child. When he made the first prick of the needle, in order to cocainize the parts for Anger's operation, the little patient grew so obstreperous that he could do nothing with her. The proposed line of insertion of the needle was then sprayed with the chloride of ethyl, obtaining enough anæsthesia to allow the introduction of the needle without attracting the child's attention, and the battle was won in favor of the operation.

The ethyl chloride will be found of considerable value in dermatological practice, especially for thorough scarification and application of the actual cautery. Dr. Bengue's bulbs intended for dental surgery are provided with curved nozzles, allowing the spray to be deposited on the desired spot. Gibson has had no opportunity to verify the use of this agent in such work. The following are Dr. Bengue's directions:

"In extracting teeth the jet should be directed to the dental nerves, as near their origin as possible; in front of the ear for the upper teeth, behind the angle of the inferior maxilla for the lower ones. The spray should be applied for about a minute; but the anæsthesia thus produced is not so complete as when the jet is applied directly to the gums, and, as this last method is devoid of danger, its use is advised in all cases except those of the last molars, which are not easily reached by the spray."

Differing from the usual action of those agents which act by refrigeration, no bad after-effects, such as great pain or sloughing of the tissues, have been noted by the writer. Care should be taken that the jet is not brought into contact with a light or incandescent surface, as the substance is highly inflammable. The eye should be protected from the spray. General symptoms of poisoning may be produced by inhalation, according to Crocker.

The writer's attention was first called to the value of ethyl chloride as an analgesic by its success in the hands of a French gentleman in the treatment of a severe intercostal neuralgia. He has found it very efficient in treating the pain of a supraorbital and occipital neuralgia. The jet was played over the painful point for a few seconds at a time, being repeated at short intervals on recurrence of the pain, without the slightest bad after-effect. Dr. Bengue suggests the use of chloride of ethyl in a very extensive class of cases, among which may be mentioned all the forms of neuralgic and rheumatic pains, various hyperæsthetic and reflex conditions, and the various forms of colic.

Chloride of methyl, so far as he has witnessed its action in the hands of others, is identical in results with chloride of ethyl. It is less convenient to use than the preparation with which Gibson has experimented, as it is contained in little bulbs whose capillary end must be broken off before use, thus necessitating the employing of the entire contents at one sitting. A rough estimate of the cost of the ethyl chloride, as used in the above cases, is ten cents for each surgical anæsthesia.

POISONING BY CRYSTALLIZED ACONITINE.

VEIL reports in *La France Médicale* the case of a druggist who by accident took a pill containing 12 milligrammes of crystallized aconitine. The poison was taken at half-past eleven in the morning, and on the appearance of the very first symptoms the attending physician administered 20 grains of powdered ipecac and $\frac{1}{16}$ grain of emetine. The stomach was also washed out. After the vomiting had occurred the patient noticed a sensation of burning in the mouth, about the face, and in the extremities. Forty minutes after the poison had been taken the face was pale, the voice was almost lost, there was a feeling of impending death, and loss of consciousness. The pulse was very small, difficult to count, and the action excessively rapid. The respiration was feeble and irregular. The extremities were cold and the skin was covered with a clammy sweat. At this time rubbing, with the applications of hot-water bottles and the injection of 15 grains of caffeine and 45 minims of sulphuric ether, was

resorted to. The pulse was now 40 to 50 a minute. The vomiting continued. After this iced champagne was administered and stimulating applications with friction were applied to the extremities. On the return of the physician two hours later the condition of the patient was still most alarming: the pupils were dilated, the skin was cold, the pulse completely lost, the respirations almost gone. The pulse was now 30 per minute, and the pupils became excessively dilated; there was also muscular trembling; the vomiting did not cease. At this time 15 grains of caffeine and 30 minims of ether were again given, and produced an improvement in the symptoms. The use of the caffeine to the amount of 7 grains was frequently resorted to throughout the night. The severe symptoms of intoxication disappeared after nine hours. The vomiting ceased during the night, under the influence of chloroform-water and elixir of paregoric. For two or three days the prostration was exceedingly severe, and at the end of the week the patient had not entirely recovered. The case is of interest, in view of the fact that ultimate recovery took place, and also of the valuable results obtained by the injection of massive doses of caffeine.

THE HYPODERMIC INJECTION OF THE SALTS OF QUININE.

In *L'Union Médicale* there is an interesting article upon the hypodermic injection of quinine, in which the following solubilities of the various salts are given:

1 part of neutral hydrochlorate is soluble in .66 of water; neutral sulphovinate, .70; neutral lactate, 2.00; basic sulphovinate, 3.30; neutral hydrobromate, 6.33; neutral sulphate, 9.00; basic lactate, 10.29; basic hydrochlorate, 21.40; basic hydrobromate, 45.02; basic sulphate, 581.

The neutral hydrochlorate is by far the most soluble of the salts of quinine for hypodermic use, and is, in addition, rich in alkaloid. The sulphovinate is also very soluble, but is not so advantageous. It has been found that the addition of antipyrin aids in the solubility of the quinine. As is well known, the hypodermic injection of quinine forms an important part of the treatment of cases of severe malarial poisoning.

THE HYPODERMIC INJECTION OF SALINES IN CHOLERA.

In *L'Union Médicale* a summary is given of the results obtained by this method. A solution is made, consisting of 5 parts of powdered chloride of sodium, 10 of sulphate of sodium, and 100 of water. The temperature is 100° F. The quantity of the injection varies from 1 to 3 pints, and they may be given from three to four times a day. In the hospital at Hamburg, Jolasse has collected the following statistics from 1017 cases: Cases treated by subcutaneous injections, 104; deaths 92, cures 12. Cases treated by intravenous injections, 167; deaths 130, recoveries 37. Cases treated by both subcutaneous and intravenous injections, 48; deaths 44, recoveries 4. Cases treated by enteroclysis, 42; deaths 12, recoveries 30. Cases treated by internal treatment, 606; deaths 248, recoveries 358. In addition, there were 50 cases of cholera in which the treatment is not stated.

ARTIFICIAL SERUM FOR HYPODERMIC INJECTION AFTER SEVERE SURGICAL HEMORRHAGE.

According to *L'Union Médicale*, CHERON recommends the following mixture for injections under these circumstances:

℞ Sulphate of sodium, ʒii;
Phosphate of sodium, ʒi;
Chloride of sodium, gr. xxx;
Pure carbolic acid, ♏xv;
Sterilized distilled water, ʒxxvi.

The inside of the thighs, the abdominal wall, or loose tissues of the back are the proper points for these injections to be made.

AN ADDITIONAL NOTE ON THE USE OF STROPHANTHUS IN THE TREATMENT OF EXOPHTHALMIC GOITRE.

At the last meeting of the American Medical Association, DR. E. D. FERGUSON read a paper with the above title. He has not kept a detailed record of the cases coming under his observation, but has had about fifteen or twenty additional cases in which strophanthus has been used. In all of these an improvement has resulted, though the degree of amelioration of the symptoms has varied. In one, a young woman twenty-two years of age, who had exophthalmos in what might be termed a hideous degree, and was incapacitated for even moderate exercise by the tachycardia, the pulse-rate being, even at rest, from 160 to 180, Ferguson was unable to reduce her pulse-rate below 110 or 120; but though in appearance she is not notably improved by the treatment, she is quite gratified with the results, for she is able to attend to household duties and travel for pleasure, even enduring without inconvenience several days

of shopping in an occasional visit to New York City.

So far as he has been able to follow the cases related in his previous paper, the improvement has continued. There was no instance of a relapse, though some have been obliged to continue the use of the drug the greater portion of the time. The first case related in the previous paper—that of a woman now over sixty years of age, and who was an extreme sufferer from the disease—has been able to keep herself in a condition for active exercise by the nearly continuous use of strophanthus.

The fact that the tachycardia is often the earliest manifestation of the disease has enabled the author in two instances to suspect the approaching development of the exophthalmos and the goitre, and so bring the patient under the influence of the drug before notable deformity had occurred in relation to the eyes and the neck, though there was sufficient change to justify the diagnosis before the tachycardia was relieved.

The writer does not urge strophanthus as a specific in Basedow's disease, for while his own experience has uniformly given favorable results, it is manifest that this complexity of symptoms may be associated with irremediable changes in the nerve-centres, or there may be conditions more favorably influenced by other drugs or measures. Many cases benefited by strophanthus may need additional therapeutic agents, and in several he has felt the necessity for the administration of iron, arsenic, and strychnine. It seems that belladonna would prove of value in some cases, and next to strophanthus he regards it as our most valuable agent. He has not observed favorable results from electricity, but the fact that some of the cases are mild and tend to a favorable termination should be taken into consideration in forming our conclusions. He is satisfied that this favorable course in some cases has been the result of the natural tendencies of the disease, rather than any effect of therapeutic measures. In his early use of strophanthus he endeavored to protect his conclusions from error in that direction by limiting its use only to undoubted cases of the disease, but it so happened that the early trials were made in severe cases.

If the individual case is favorably influenced it will then be wise to inform the patient of the probable necessity for a prolonged use of the agent, for though a few months often seem sufficient in some cases, others may require its use for an indefinite number of years.

The question of dosage is one of considerable importance, for it varies greatly in individual cases. When strophanthus was first introduced by Frazier its dose was given at from 4 to 7 drops of the tincture, but it was soon manifest that either the individual specimens of the drug differed greatly in potency or personal susceptibility was an important factor. It is true that from 5 to 10 drops will occasionally give notable results, but in his experience Ferguson has shown that much larger doses are often required. His present plan is to have the patient secure a sufficient quantity of the tincture to obviate the necessity for frequent changes of the preparation, and then to begin with 8 to 10 drops at each of the three daily meals, using always the same dropper. After a week, if no benefit results, this dose is increased by one or two drops, and in this way continued and increased until its beneficial results are obtained or until there is evidence of injurious effects, though so far he has not been obliged to cease from its use on account of toxic symptoms. Injurious or unpleasant effects will furnish indications relative to its continuance or the dosage.

In this way he has increased the dosage to 50 drops three times daily—an amount found by actual measurements to be about thirty-five minims—before relief was experienced, and this large dosage has been continued for several months, not only without unpleasant effects, but with great relief.

It seems the part of wisdom to have the patient purchase the drug in considerable quantity at each time, thus obviating the necessity for frequent changes in preparations; and when taking large doses it may be well to take somewhat less than the maximum dose when a new specimen is procured, for it is a clinical fact that the activity of the preparations is not uniform.

TOXIC EFFECT OF GALLIC ACID.

BELL (*New Zealand Medical Journal*, No. 3, vol. vi., 1893) reports the following case: T., aged thirty-two, male, had been suffering from internal hemorrhoids for two or three years. Latterly there had been venous hemorrhage with each movement of the bowels, etc. He had tried various remedies, such as cold water, etc., and had touched the piles with tinct. ferri perchlor. and liq. ferri perchlor. to check the bleeding. He had lost about a dessertspoonful of blood a day for two months or more.

Operation was advised, but he wished to give other remedies a trial first, and used hazeline, injected into rectum and also taken

internally by the mouth, for a time with no benefit; also chlorate of potassium. He then got some unguentum gallæ cum opio, and one morning applied it freely to the bleeding hemorrhoid just after a motion. The piles were not painful, and all discomfort ceased when the pile was replaced. There was no bleeding, nor did the pile come down except when the bowels were moved. After using the gall ointment the first time he had an attack of what appeared to be hay asthma; not severe. This was attributed to his having inhaled some irritating dust.

Three or four days afterwards he had a similar asthmatic attack, followed by an eruption of urticaria for three or four hours.

The hemorrhage from the piles still continuing freely at each motion, Dr. Bell asked him to use a 3-grain tannin suppository a short time before and after each movement of the bowels.

In the afternoon, feeling quite well, he inserted a suppository. In about four minutes the symptoms of the asthma began to appear. First there was pain and a tight feeling under the sternum and trouble in breathing; the breathing became quicker and labored, accompanied with wheezing and an occasional cough, until, in about half an hour from the time the suppository was introduced, all he could do was to lie on the bed gasping and straining for breath, face flushed, hot and perspiring, râles and rhonchi all over the chest, and pain on coughing. With each cough a little pellet of mucus was expelled. This condition lasted for another half-hour, and then the pain and rapidity of breathing began to subside, but then the attack of urticaria commenced. Starting about the head and neck, it extended all over the body, and became especially marked about the feet. The irritation and itching were intense. Some of the wheals were from two to three inches in diameter. At the end of about four hours the cough had stopped, the breathing had returned to normal, but the irritation of the skin continued in a less degree till next morning.

The patient has never had any asthma or anything approaching it before or since, nor have any of his relatives ever had anything of the kind; nor has he ever had urticaria or any skin eruption whatever.

There can be no doubt but that both these symptoms were caused by the absorption or irritation of the tannic or gallic acid applied to the hemorrhoid. None of the other drugs used, such as steel drops, hazeline, chlorate of potassium, etc., caused any symptoms like the above, nor did the symptoms appear except when the tannic or gallic acid was used, so it can only be concluded that in some peculiar way the gallic acid has had a toxic effect. Both the drugs have been used frequently, by the chemist who made up the ointment and suppositories, for other patients without causing any such symptoms.

Later the patient agreed to an operation, but first of all went South for a change. Three or four days after leaving home and getting to a cooler and more bracing climate, the bleeding stopped, he felt much better, and ate better. In a fortnight the anæmia was gone, and although the piles still remained, yet they were so much improved that he decided not to undergo the operation at present.

THE USE OF COCAINE TO PRODUCE ANÆSTHESIA OF THE SKIN AND TISSUES BENEATH IT.

JACKSON, in the *Medical Record*, contributes an interesting paper on this subject.

From the first use of cocaine as a local anæsthetic the difference between its effects on mucous membrane and on skin was universally recognized. The probable reason for the difference is the greater thickness and horny character of the epidermis, which offers a sufficient obstacle to prevent the rapid absorption of the drug into the sensitive tissues beneath. The magnitude of this obstacle varies with the thickness of the epidermis in different parts of the body, it being greatest on the back and outer sides of the extremities and least on the inner surfaces, and particularly on and near the eyelids.

Probably better local anæsthesia can be obtained in the skin of the lids by the external application of cocaine than in any other part of the body. The application must, however, be sufficiently prolonged to allow of the soaking through of the epidermis by the fluid in which the drug is dissolved. While the various oils have been used to carry cocaine into contact with the tissue to be affected, they are of inferior value, probably because they do not give up the drug with sufficient rapidity to the serum of the tissues, and the watery solution gives better practical results. Its superiority has been very decided.

Method of applying.—Dropping the solution upon the surface is quite inefficient. In order to get the soaking of the epidermis necessary for the transmission of the drug, the surface must be kept moist for many minutes. This is readily accomplished by keeping it covered

with a pledget of absorbent cotton which is kept saturated with the solution.

The solution used should be as strong as possible, at least when it comes in contact with the tissue; if, however, the surrounding air is dry and the absorbent cotton is freely exposed to the air, the evaporation will readily bring even the weaker solutions of cocaine up to near the point of saturation.

A most serious obstacle to the necessary soaking of the epidermis is the presence in it of a considerable amount of fat. This may be removed by carefully washing with soap or other alkaline preparations. Yet this very precaution has probably been the cause of complete failure in many of the attempts to produce cocaine anæsthesia of the skin. The presence in the epidermis or upon its surface of any residuum of alkali leads to the precipitation of the alkaloid cocaine from the solution of its salts in a form that is quite insoluble, so that profuse washing of the skin to remove the fat may, by substituting the alkali, render it far more impervious to the anæsthetic than it was originally.

In practice this may be guarded against by the prolonged use of pure water to remove all traces of alkali.

Again, the fat may be removed from the skin by careful washing with ether, and this is the best means if sufficient time is not available for rather prolonged preparatory treatment.

It is probable that the general condition of the lymph-vessels materially influences the amount of the drug taken in through the epidermis. But to balance this, when absorption is most rapid into the skin, the removal of the drug from the point of introduction is also most rapid, so that the effect in anæsthesia obtained is not materially altered by the general condition of the lymphatics.

With the best application and under the most favorable circumstances the anæsthesia obtained by the application of cocaine to the surface is extremely superficial. Simply by such application, continued while the incision is slowly carried down from layer to layer of tissue, the incision can be gradually and painlessly extended to any desired depth. At least this is true of incisions that do not present so great a surface as to cause danger of cocaine-poisoning and are not made through inflamed tissue. But this process is an extremely slow one.

If the incision is to be carried at one stroke below the true skin, even in the thinnest portions the anæsthesia will not be deep enough to render it entirely painless, unless the cocaine is also introduced hypodermically. To use it hypodermically with the best success, it is essential to bring the drug into direct contact with the tissue to be cut or injured, in the greatest degree of concentration practicable, to get it promptly diffused throughout this tissue, and then to complete the operation before time has elapsed to allow of its being carried off into the general circulation.

The author's method, then, of using cocaine upon the skin is first to prepare the surface, either by washing with ether or with an alkali, followed by prolonged rinsing with pure water; then to keep the surface covered with absorbent cotton saturated with a strong solution of cocaine for ten to twenty minutes. After that, for a rapid operation, to introduce the cocaine hypodermically directly into the tissue to be cut, rapidly secure its sufficient diffusion by massage, and then perform the operation within a very few minutes. Used in this way, cocaine is capable of very greatly lessening or entirely preventing the pain of the removal of tarsal tumors and even of dermoid cysts situated in the region of the lids or orbit. But it is always to be borne in mind that in the presence of hyperæmia and inflammation cocaine has little or no power as an anæsthetic.

CAMPHORATED CARBOLIC ACID AS AN ANTISEPTIC AGENT.

TOMS contributes to the *Medical Record* a paper with this title, and in the course of it points out that it is very interesting to learn that that eminent surgeon,—"the father of antiseptic surgery,"—Sir Joseph Lister, has recently announced that he has returned to his first love,—carbolic acid. After these many years since his first employment of it for a definite purpose of prophylaxis against the entrance of germs to fresh wounds, and for antiseptic and germicidal purposes,—the birth of the "antiseptic" idea and theory,—after these years of painstaking clinical experiment and bacteriological research, it is at least remarkable that the first antiseptic, used as such, should now hold the first place in the favor of so careful an experimenter and observer as Lister. All those chemical agents which have enjoyed more or less confidence in their efficiency by authorities in surgery as "antiseptics" seem, after thorough testing of their merits, to have been found wanting. To be sure, the "antiseptic" theory has largely been supplanted by "aseptic" principles,—the natural evolution of the primary conception of the author; but there are many surgeons who,

while still having much confidence in carbolic acid, yet find very many and grave objections to its employment in a general way in surgical work, especially in private practice.

Its field of usefulness, although acknowledged by its most ardent employers to be perhaps greater than that of any other permanent and staple compound combining the essential antiseptic properties, would be still greater were it not for toxicity, odor, caustic action, etc. Its employment as a germicide, in strength sufficient to be effective against pyogenic bacteria and their spores, is fraught frequently with considerable danger, and often in an infected wound is not at all possible, excepting by a long and continued use in much reduced strength, in which nature plays the most important *rôle*, owing to its destructive effects on living tissue. As an antiseptic protective against the entrance of bacteria infecting a sterile wound through the dressings, it is questionable if it does not materially impair the integrity of healthy structures rather than act kindly in promoting the process of repair.

Recently the writer had occasion to resort to other means than the regulation dry dressings with dusting-powders—iodoform, aristol, dermatol, etc.—in treating an extensive ulcerating epithelioma whose surface covered about six hundred square centimetres of the leg. Amputation was out of the question, owing to the debility and age of the patient.

The odor, amounting to stench, the extreme irritability of the wound from exposed nerve-filaments, the deep points of ulceration, extensive absorbing surface, together with the profuse discharge, made up a condition that put his ingenuity to test. After employing "them all," together with antiseptic absorbent dressings, and almost despairing of ameliorating the sufferings of his patient or mitigating the condition in his home, his mind reverted to Lister's first choice and last resort,—carbolic acid,—in the hope that perhaps it could be utilized in some form to meet the indications in so appalling a case. Certainly carbolic acid possessed the ideal properties,—*i.e.*, antiseptic, deodorant, and anæsthetic,—but its offensiveness was only second to that of the wound; besides, it would be required to employ it strong enough to check suppuration, in which strength it would be caustic or certainly irritating, while the extent of surface gave reason to fear possible absorption and development of toxic symptoms from prolonged use of the drug. Remembering a proprietary preparation which claims to be a fifty-five-per-cent. solution of pure carbolic acid combined with camphor, and is stated by its manufacturers to be non-irritating, the caustic properties of the acid being destroyed, he concluded to try this on the wound of his patient.

Instead of using the proprietary article, he had a pharmacist make a small quantity after the formula of Bufalini, as given in the United States Dispensatory, to see in what way it differed from the secret article. He found no difference whatever in appearance, excepting that the full-strength preparation was not irritating to the mucous membranes of the mouth, while the proprietary article was. He also had it made in the fifty-per-cent. combination, which differs only in strength from Bufalini's formula, and this was not found irritating to mucous surfaces. It is stated in the Dispensatory that this preparation retains the full antiseptic and germicidal properties of the acid, without its destructive action to living tissue.

In the writer's case he diluted it with fifty per cent. of cotton-seed oil, applying it directly to the ulcer and covering it with sheet-cotton saturated with the same; over this was spread a dry antiseptic absorbing-pad made of powdered charcoal and antiseptic wood-wool, about half an inch thick, spread evenly between cheese-cloth gauze.

For cleansing purposes an irrigating solution was employed, composed of 1 to 1500 bichloride of mercury, combined with 3 to 1000 sulphate of copper, which he has found more effectual than the bichloride alone. After the accumulated secretions are fully washed away, the surface is sprayed with fifteen volumes peroxide of hydrogen, after which the application is made as described. He has been using this now for about three months in this case, with the happiest results,—perfect deodorization of the wound and lessening the formation of pus.

The patient is markedly more comfortable, the irritation has been allayed by the antiseptic and local anæsthetic properties of the remedy, and the extensive breaking down of tissue has been materially checked. Only one dressing is used in twenty-four hours, yet his freedom from pain enables him to comfortably sleep throughout the night, dispensing with the use of morphine, which he had been in the habit of taking, and requiring as a substitute a mixture of bromide, chloral, and hyoscyamus, in very moderate amounts. Moreover, the household are not continually nauseated by the all-pervading odor of the offensive discharges permeating the entire house. He has also employed this valuable antiseptic in recently lacerated wounds, and found in every

case healing promoted under one dressing by primary union.

A nice drain can be made by dipping sterilized candle-wicking into camphorated phenol. It is far superior to all forms of dusting-powders, in the fact that it is not decomposed by contact with the serum-albumin and liberating irritating elements to fresh wound surfaces, as in the case of the iodine derivatives. It keeps the wound moist, is absolutely unirritating,—on the contrary, is anæsthetic,—promoting the process of healing in the most kindly manner, and is the best protection we have against the entrance of bacteria. For this reason it is used to cover cœliotomy and other wounds where union by first intention is so desirable. He also believes it has positive therapeutic properties in dermatology.

ON THE INTERNAL ADMINISTRATION OF CALOMEL IN THE TREATMENT OF PSEUDO-MEMBRANOUS LARYNGITIS.

KOHN, in the *Medical Record*, highly recommends calomel in the treatment of true croup. He thinks that the remedy, which experience has shown to have the effect on the membrane of liquefying or softening it, is therefore the great desideratum; medicated steam inhalations (lactic acid, lime-water, turpentine) and sublimed calomel (Dillon Brown) have been given with this object in view.

Calomel administered internally, in the manner to be hereafter described, has seemed to have a satisfactory effect, and the results have been so gratifying that this method of treatment seems worthy of the highest commendation.

To a child under two and a half years .05 gramme of pure calomel is given hourly, sleeping and waking; for each year above two and a half years add .02 gramme of calomel to the hourly dose. A child of five years would, therefore, take .01 gramme of calomel every hour. The calomel must be absolutely pure and undeteriorated; it should be given without the admixture of sugar of milk or of any sugar whatever; it may be administered either floating on a teaspoonful of water, or, if the child refuses this because he knows it to be medicine, it may be given in milk, entirely unnoticed by the patient.

The case should be under the watchful care of a trained nurse, who must keep an accurate record, noting the slightest perceptible change in any of the characteristic signs. After one or two grammes of calomel have been given, a change in the laryngeal breathing sound should be noticed. The treatment should and can be instituted at the earliest possible moment after the diagnosis is made.

The writer has given a child of two and a half years .06 gramme of calomel hourly until 4 grammes were taken; the patient recovered. To another child of three and a half years 5 grammes were given with success. A stimulating and supporting regimen to combat the sepsis was adhered to,—beef soup, white of egg, milk; Tokay wine or whiskey was administered at very frequent intervals.

The administration of nourishment and stimulants half-hourly to sustain the heart power is of the highest importance; everything given the little patient should be palatable and easily taken, as every struggle of the child against taking food or medicine increases the laryngeal stridor and perhaps causes the membrane to extend downward.

The use of mercury in plastic inflammation is one of the traditions of medicine: its praises have been sung by medical writers for more than a hundred years. Whether its so-called antiphlogistic properties are explicable by reason of its destructiveness of germ-life is not known. The action of calomel in croup, given as above described, bears out the old belief in actual experience. Under its use the stridor, the aphonia, the cough, in short, all the symptoms, slowly abate, showing that the membrane is gradually loosening its hold and becoming innocuous.

The advantages of calomel over sublimate are self-evident; the former is mild, non-irritating, can be taken for the necessary length of time without any other effect than a passing diarrhœa, perhaps, while the sublimate is a pronounced irritant poison, which, taken in frequent doses, will cause pronounced gastro-intestinal irritation, necessitating an interruption in the treatment at a critical period.

The powder of calomel of six centigrammes is small, tasteless, and easily administered to the most obstreperous child; not so with the bichloride mixture, when given hourly. If inunctions with blue ointment have been attended by the success claimed for them in diphtheria, then mercury absorbed into the circulation seems to have a controlling influence over the diphtheritic infection and its local manifestations.

For administration to children, calomel must be preferred to all other preparations of mercury, for reasons that are obvious. The danger of salivation is minimal; the writer has never seen a case of ptyalism among children treated with calomel.

Severe diarrhœa has also been very rare. Three, four, or even five movements a day under the calomel therapy should be advantageous in this disease, provided the patient take nourishment; the sepsis is, to a certain degree, mitigated by the free action of the bowels.

Should the diarrhœa assume a severe or alarming character, the dose of calomel may be diminished, or the intervals between doses prolonged, or a starch injection, with or without a little paregoric, may be given; and if the laryngeal obstruction seems to be lessening, the calomel should not be stopped altogether under any circumstances.

A very strong argument, from a pathological stand-point, in favor of the antiseptic treatment by calomel, or by mercury in any form, is found in the statistics and post-mortem examinations of Prudden and Northrup. In one hundred and fifty-one fatal cases, pneumonia was found in one hundred and four. In Northrup's article in "Keating," in eighty-seven cases, the larynx alone was affected in only one case; in another the membrane extended from the pharynx to the middle of the trachea; between this point and the bronchi of the fourth division nothing was to be found; from these to the finest bronchi, membrane was present; in thirty-four cases the membrane extended from the pharynx down to the finest bronchi. In view of this extensive growth of membrane, of what use can an inhalation be? The tidal air, which alone can carry the inhaled medicament, never reaches the finest bronchi; of what use, therefore, is any local treatment? The treatment by sublimed calomel (Dillon Brown) seems to be that which is advocated in this paper, but in a different form. It formerly was one of the methods of mercurializing a patient to volatilize calomel on a metal plate by means of an alcohol lamp. The treatment has the disadvantage of salivating the attendants of the child.

In mercury we have a drug which, absorbed into the circulation, would seem to have a specific effect on the membranous exudation of laryngeal diphtheria; and, of all its preparations, the mild chloride for administration to children is the best for easily bringing the system rapidly under its influence.

It is not claimed that recovery occurs in every case, nor is the writer in a position to bolster up assertions by statistics; favorable statistics would be accepted with incredulity any way. The simplicity of this method of treatment, ease of application, and the fact that treatment can be instituted the moment laryngeal stridor is noticed, in even the youngest child, are arguments in its favor.

Should the patient go from bad to worse, in spite of the treatment, and the symptoms assume a grave character, recourse can always be had to intubation or tracheotomy; and early operation, be it intubation or tracheotomy, Kohn believes should be decidedly discountenanced.

THE TREATMENT OF IMPETIGO.

In an article in *L'Union Médicale*, THIBIERGE gives the following prescriptions for this affection:

℞ Vaseline, ℥i;
Boric acid, gr. xlv.

Or,

℞ Vaseline, ℥i;
Boric acid, ʒss;
Oxide of zinc, ʒss;
Salicylic acid, gr. vii.

He states that Besnier frequently employs the following ointment with advantage:

℞ Plaster of Vigo,
Vaseline, of each, equal parts.

Dubreuilh recommends the following:

℞ Vaseline and lard, of each, equal parts;
Oxide of zinc, gr. lxxv;
Salicylic acid, gr. vii;
Crystallized acetate of lead, gr. iii.

Vidal recommends the following:

℞ Simple cerate, ℥i;
Yellow precipitate, gr. x;
Oil of cade, ♏l.

THE TREATMENT OF WHOOPING-COUGH WITH QUININE.

After sixteen years' experience in treating whooping-cough with all the usual remedies, DR. P. BARON writes (*Berliner Klinische Wochenschrift*, No. 48), warmly commending the use of quinine. He has used it in about fifty cases. Usually several days elapse before the improvement is marked, in part, no doubt, because much of the medicine is lost through vomiting. Sometimes its good effect is observed in two or three days. When once begun, the improvement makes rapid strides in decreasing the number and the severity of the attacks, even if the dose is diminished and given less frequently. He thinks a cure may be obtained, on an average, in six weeks. No relapse has ever come under his observation in

children cured of whooping-cough by the use of quinine.

But while unsurpassed for ordinary whooping-cough, the value of quinine is best appreciated when used for cases where acute affections of the lungs occur. Whether as an antipyretic or as a specific could not be determined, but its action was excellent. In one case, after but a few days' use of quinine, the relatives reported, beaming with joy, that the child, which was suffering with acute disease of the lung, demanded food and played, and that the fever had disappeared.

He cured three very severe cases with it. One was a delicate seven-year-old girl, sent from the city by the physician as a very last resort, hoping the change of air would benefit the whooping-cough. The child was daily growing worse. When Baron saw it, on June 18, there was a disseminated pneumonia, so severe that, in spite of his great faith in quinine, he felt no hope of its recovery. The child could not be prevailed upon to take the least nourishment, and the coughing prevented any sleep. As he believed quinine the only remedy, he tried to give the child three capsules, and was finally successful. At his next visit, on June 23, the child was sitting up in bed, and, although there were still dull places in the lungs, it was nearly free from fever, had some appetite, and was able to sleep some. The improvement continued from day to day, and no other remedy was required besides the quinine.

Another child was in a wretched, poor home, and had barely recovered from a long attack of inflammation of the lungs a year before. The whooping-cough was soon complicated with inflammation of the lungs. As soon as Baron gave the quinine the child improved, and, in spite of all the drawbacks, was well in three weeks' time.

Another child, three years old, had pneumonia with the whooping-cough, and was so reduced that both hands and feet had swollen. The action of the quinine was not so immediate here, but in three weeks the child was well.

No bad result from the quinine was ever noted. He thinks it should be determined whether it could be used as a prophylactic. The single dose is ⅙ grain of the hydrochlorate for each month, and 1½ grains for each year, of the child's age, given three times a day, preferably at 6 A.M. and at 2 and 10 P.M. Strong children require a larger dose, but a larger dose than 6½ grains to children over four years is generally not required.

USE OF HYDROGEN PEROXIDE IN THE PERITONEAL CAVITY.

In a very brief communication to the *New York Medical Record*, W. H. WIGGIN states that he has employed peroxide of hydrogen in full medicinal strength in cases in which, by accident or disease, pus has obtained entrance into the peritoneal cavity. He believes that this method is entirely without danger, and promises another communication upon the subject when his experience is larger.

A NEW AND RAPID METHOD OF ANÆSTHESIA.

DR. MAGILL, of Chicago, reports the following method of producing anæsthesia to the *Medical Record:*

The method was devised and developed, during the summer and fall of 1892, by Dr. Bourbon, anæsthetist of Hôpital Bichat, Dr. Hartman, acting surgeon, and Magill, and, since its introduction, is the preferred method in the surgical service of Professor Terrier, at Hôpital Bichat. The *modus operandi* cannot better be described briefly than is done by Professor Terrier in his communication on the subject to the Société de Chirurgie of Paris, October 19, 1892:

"The bromide of ethyl should be given in large doses. After pouring it abundantly [about 3 grammes] upon a folded towel, it is placed over the nose and mouth of the patient, who is told to breathe deeply. Generally at the second or third inhalation a slight agitation appears, but at the fifth or sixth the anæsthesia is complete, with total loss of consciousness. With the continuance of this anæsthetic, in a moment, sometimes preceded by tonic contracture, the complete muscular resolution is accomplished, with congested face and dilated pupil. At this moment the towel saturated with ethyl bromide is rejected, and another upon which chloroform is poured is substituted in its place, without allowing any interruption of anæsthesia in changing. The first dose of chloroform only should be fairly strong [1 gramme]. At this moment the operation may be commenced [about three-quarters to one minute since the commencement of the anæsthesia]. The facial congestion diminishes little by little, the pupillary dilatation gives place to retraction; in a word, the transition from the anæsthesia of the bromide to that of chloroform is accomplished without the slightest interruption of the sleep. From this moment the continuance of the anæsthesia is done in the ordinary way [chloroform in small and

regular doses]. The difference is simply that the complete anæsthesia is immediate, instead of resultant of a period often long, which is necessary in the process of chloroform anæsthesia." [And more so in case of employment of ether.]

The matter in brackets is not a part of Professor Terrier's communication, but inserted as explanatory.

It will be seen that the duration of the anæsthesia may be prolonged at the will of the operator. Experience has demonstrated that by this process a remarkably small quantity of anæsthetic agents suffices for complete and protracted unconsciousness, and that by reason of the smallness of the quantity used, the awakening of the patient almost immediately follows the cessation of administering chloroform.

The writer has performed a complete anæsthesia for ovariotomy by Professor Terrier with the administration of 3 grammes of ethyl bromide and 12 grammes of chloroform, recovery from sleep immediate, and no subnausea. Duration of the complete anæsthesia thirty-two minutes.

This is only one of many similar cases which will be found in the publication of the clinical studies. How many anæsthetists are there who can obtain a complete resolution of a vigorous subject with 12 grammes of chloroform only?

The advantages claimed for this method are,—

1. Rapidity, a complete anæsthesia, which allows the commencement of the operation in one minute's time after the first inhalation of the anæsthetic.

2. Doing away with all violent agitation on the part of the patient, so common when chloroform or ether alone is used.

3. On account of the dissimilar physiological action of the two anæsthetics employed, the dangers attributed to the use of chloroform alone are in a great measure eliminated by the counteraction of the ethyl bromide previously administered.

4. An almost entire absence of post-operative nausea.

In February of this year this method was introduced in the service of Dr. Segond, at the Maison de Santé, the City Hospital of Paris, by Dr. Malherbe, and immediately adopted by Dr. Segond for all of his work, to the exclusion of other methods. It was the writer's privilege to introduce this method in the service of Dr. Monod, at Hôpital St. Antoine, in April of this year, which led to its adoption as the current method throughout his wards. Dr. Richelot, of Hôpital St. Louis, has spoken with considerable favor of this process of anæsthesia in the discussion at the Société de Chirurgie, and employs it in his service in preference to all others in cases where affections of the heart cause any apprehension from the use of chloroform alone.

The patients who have been subjected to this method of anæsthesia have pronounced in its favor, and in cases of an anæsthesia to be repeated for them have asked for this method.

In a short time a monograph on the subject, with complete bibliography, chemical and physiological aspects, and several hundred detailed clinical studies of its application, will be published in Paris as a complete history and introduction of the subject. There appears to be no element of danger in the combined employment of these two agents for a complete anæsthesia, and the simplicity of its application will be evident on trial.

NOTE ON THE EMPLOYMENT OF CALCIUM CHLORIDE AS A HÆMOSTATIC.

SAUNDBY, in the *Birmingham Medical Review*, contributes a short note upon this subject, basing his experience upon the experimental report of Professor Wright. The three following cases are therefore of interest:

The first of these was a middle-aged woman, with chronic jaundice of six months' duration, believed to be due to an impacted gall-stone. She suffered from pretty free hemorrhage from the rectum, apparently proceeding from some internal piles, but the bleeding was decidedly more than we should have expected from the state of the bowel. Our first efforts were directed to remove the hard fæces which could be felt in the rectum by the use of olive-oil injections, and to keep up a daily action of the bowels by the administration of saline aperients; but as after fifteen days these means failed to check the bleeding, calcium chloride in small doses was administered every four hours, with the satisfactory result that after five days the hemorrhage ceased and did not return.

The next case was even more striking, as it was that of an elderly woman, admitted with purpura hemorrhagica,—that is to say, she had a purpuric rash over the body and limbs, free bleeding from the gums, and slight hæmaturia. The free use of ergot, gallic acid, and acid infusion of roses not having been followed by any benefit, on the third day after admission she was placed upon small doses of calcium chloride every two hours, after which the bleeding di-

minished, and five days later had ceased altogether, the patient making a good recovery.

In the third case, which was one of phthisical hæmoptysis, calcium chloride was used in combination with other measures, but, in spite of all treatment, a profuse hemorrhage set in which carried off the patient. At the autopsy we found an aneurism of the pulmonary artery projecting into a cavity, a condition which sufficiently explained the futility of our remedies.

With respect to dose, it is noteworthy that Professor Wright found, after giving 1 gramme thrice daily for four days, that the coagulability became enormously diminished,—*i.e.*, to over one hour,—and on certain experiments upon himself he believes this was due to the administration of calcium chloride having been carried too far, for he found that when too large a dose of the salt was added to decalcified blood *in vitro*, coagulability decreased, and on taking 2 grammes of calcium chloride three times a day the coagulability of his blood rose during the first twenty-four hours, returned to normal during the second, and in the third fell below normal, so that the best results may be looked for from comparatively small doses. In the author's cases the drug was administered in the form of the liquor calcii chloridi of the new British Pharmacopœia, which is of the strength of 1 to 5, and the dose employed never exceeded 30 minims, or 6 grains, though in the case of purpura this quantity was given every two hours during the day for some days.

NOTE ON THE TREATMENT OF WARTS BY THE INTERNAL ADMINISTRATION OF ARSENIC.

Sympson contributes an article on this subject in the *Quarterly Medical Journal.*

Though warts sometimes disappear spontaneously without any treatment whatever, and although the treatment of them by various kinds of outward applications is often perfectly successful, yet quite enough cases are found apparently intractable by ordinary methods to justify a short note on the use of a drug which seems specially adapted to cure this tiresome and vexatious complaint.

First a word or two as to local remedies. The writer has tried on different patients, and occasionally the same patients, nearly all the drugs usually recommended for the abolition of warts. Such are glacial acetic acid, salicylic colloid, fuming nitric acid, carbolic acid, liquor potassæ, and argenti nitras. The first two named in this list seemed to act best, and the salicylic colloid he prefers of the two, as most easily applied by any unskilled person and least irritating to the patient.

But for the last few years, acting on a suggestion in an American medical journal, and on account of Mr. Pullen's paper (*Practitioner*, 1888, vol. i. p. 207), in every case of warts which did not show some sign of yielding to these applications in ten days or a fortnight, he prescribed small doses of arsenic internally. Of its rapid action on the warts there can be no doubt whatever. He has repeatedly tried it by itself, and by the end of a fortnight even a large crop of warts will have disappeared. An advantage also of its use alone is that by children (who are, of course, the chief sufferers from warts) any kind of caustic or painful application is much dreaded; also very little arsenic need be given. The drug need not always be given as long as a fortnight, for a week's treatment by small doses twice a day seems to set up a healthy action in the warts, which is continued after the medicine has been left off. The combined treatment, though, of arsenic internally, with salicylic colloid painted daily on the warts, is quicker than that by arsenic alone. The author gives 1, 2, or 3 minims either of the liquor arsenicalis or liq. arsenici hydrochlor. twice or three times a day, according to the age of the child, and has never found it needful to exceed the largest dose. He has never found any symptoms of its disagreeing with the patients.

Its action on the warty growth is no doubt due to the increased metabolism of the skin, leading to these hypertrophied portions being killed and exfoliated.

It is somewhat curious to note that arsenic has been accused of producing warts.

A SHORT CRITICAL ANALYSIS OF TWENTY-SEVEN CASES OF TETANUS TREATED WITH SERUM OR TETANUS ANTITOXIN.

Behring and Kitasato (*Deutsche Med. Wochenschrift*, 1893, pp. 152–154), through the most brilliant researches, have shown us by what therapeutic measures we may hope to overcome the most deadly of infective diseases. Tizzoni and Cattani, in Italy, and Roux and Vaillard, in France, followed closely in their footsteps. Of all microbic diseases, the most hopeless to treat or prevent was tetanus. Animal experiments, however, have shown that by means of injections of serum obtained from immunized animals it is possible not only to protect animals against tetanus, but also to

cure those which already suffer. Those experiments were soon applied to man, especially in Italy, and a small number of cases is already on record. It may not be out of place in the present journal to put these cases together and see what lessons have been learnt from them. We may say at once that though it will be found that so far the treatment has been of little benefit in really serious cases, that, nevertheless, the serum treatment is at present the only rational treatment to be employed. Our English laboratories, unfortunately, cannot supply the precious substance. Roux and Vaillard, however, are always ready, with the courtesy characteristic of the Institute Pasteur, to supply hospitals with the serum; and, so long as the latter is not procurable in our country, we advise surgeons to apply at the institute, so that they may have the serum ready in an emergency, instead of losing time when they are brought face to face with a case.

Eleven cases have been treated by antitoxin obtained from Tizzoni and Cattani, of Bologna, and none of these have ended fatally, and on the strength of this result the Italian school considers the curative action of the serum as proved. The antitoxin is practically nothing but serum; it consists of the alcohol precipitate of immunizing serum, and we shall not draw any distinction between serum and antitoxin, especially since latterly Tizzoni has used both the serum and antitoxin in the same cases. On looking into the Italian cases we find, however, that they were all of a mild type, as pointed out by Rotter and Roux and Vaillard. The last case, published recently in the *Centralblatt für Bact.*, at first sight is more acute or malignant, but on closer inspection one may really doubt whether it was the serum and antitoxin which cured. The temperature in this case was never raised, and after the first injections the symptoms did not abate. Taking them altogether, we must confess that these eleven cases were more or less benign, and here the antitoxin treatment did good. In most cases, with three exceptions, the incubation period extended over ten or more days, and in almost all of them the treatment was not begun until two or three weeks after the primary injury; and though a cure resulted in some cases after a few days, in most cases this did not take place until six to twelve days after the first injection. A case such as this, for instance, is quoted as a successful one by Finotti. The disease began twenty-four days after the injury; injections were begun five days later, and continued until the forty-second day. The severest case so far treated by Tizzoni, as we mentioned just now, is the eleventh, where tetanic symptoms appeared on the sixth day, and treatment was commenced almost immediately and carried on for five days, when the patient was practically out of danger, though the tetanic seizures did not entirely disappear until the sixteenth day after the injury. We do not wish to detract from the merits of these cases, all the less as we are advocates of the new treatment, but it is our duty to weigh all points and not to raise false hopes. These eleven cases cannot prove much either for or against the usefulness of the antitoxic serum as a curative agent. How true this is will become clear if our readers be reminded that it seems that only the successful cases have been published by the Italians. We can hardly understand such a secrecy and misapplied reticence in this country. Rotter mentions three fatal cases of which he has heard, and Albertoni, as well as Roux and Vaillard, refer to the culpable suppression of fatal cases treated by Tizzoni's method.

If we now glance over the cases of tetanus treated by serum obtained from Behring, we find, again, that in acute or severe cases the result has hardly been satisfactory. We have succeeded in collecting six cases. Of these, four survived, but none of them were really severe. Rotter, for instance, who relates one case, never feared for his. Moritz's case was serious, but chronic, and the other two were unquestionably mild. Of the two fatal ones, we must, in all fairness, exclude the case treated by Baginsky and Kitasato, since here only a very small dose of serum was administered, and in the other fatal case it seems that the serum was not so strong as might have been wished. Any way, it will be seen that from these six cases a just conclusion as to the efficiency of the curative serum in tetanus, as we are likely to meet it in hospital practice, cannot be drawn. We realize this still more on studying the cases published by Renon and Roux and Vaillard. Renon's two cases both ended fatally. They were treated with rabbit's serum, but we find no data as to the efficacy of the serum, etc. Of these, we must again exclude one,—a successful one,—since here the tetanic seizures ceased after the amputation of the injured finger, and, besides, the quantity of serum injected was so small that we can hardly believe that it had any effect on the course of the disease. They relate two other successful cases, but say themselves that "à aucun moment ces deux malades n'ont donné de sérieuses inquiétudes." On the other hand, five acute and

severe cases, treated as early as possible with large quantities of very active serum, were not benefited in the slightest degree.

Taking all the twenty-seven cases, then, without critical analysis, we find that of twenty-seven cases to which serum was given, nine died. To these we ought to add at least three, if not more, which have been suppressed, so that of thirty cases, twelve were fatal. Now, what is the percentage of deaths in cases of tetanus treated on ordinary hospital principles? Behring would make us believe that eighty to ninety per cent. of all cases are fatal, while Albertoni's figure is twenty-four, Sormanni estimating it at forty-four. According to Roux and Vaillard, fifty most likely represents the correct percentage in our modern antiseptic days, and if this be so, we find that the thirty cases treated with serum have not been accompanied by sufficient success to warrant us in giving a favorable prognosis in those cases which have been treated with antitoxin serum. But are we, therefore, to give up this method of treatment? By no means. We must confess, with Roux and Vaillard, that in the rapid form of tetanus the serum treatment has been powerless, and has not in the slightest degree modified the course of the disease. But in practice we cannot choose either case or opportunity, and our remedies must be employed under the conditions as they exist. However, all cases, successful or fatal, should be published, so that we may learn what we are entitled to expect from the antitoxic treatment. At present it seems that in severe and rapid cases of tetanus the prognosis is as bad as ever, and Roux and Vaillard found that this is true also for tetanus artificially produced in animals, for they say that in animals "le traitement a échoué dans les tetanos graves." It may be that we require more active serum than it has so far been possible to obtain. The French authors give what seems to us to be sound advice,—viz., to use the serum as a preventive measure in contused and dirty wounds, either in hospital practice or on the battle-field, and in such cases where there is a possibility of tetanus setting in. Tetanus is a rare disease, but many who are seized by it are doomed to die a miserable death. A small dose will suffice to prevent, while a cure may be impossible with large doses. Why, therefore, not attempt prevention, especially when it is so easy to procure the serum in a suitable form from the Institut Pasteur? We again urge on all hospitals the necessity of providing for themselves a suitable quantity of the antitoxic serum, and we only regret that there should be no laboratory in England capable of supplying what our brethren across the silver streak liberally offer us.—*Medical Chronicle*, vol. xix., No. 1.

ESERINE IN THE LOCAL THERAPEUTICS OF IRITIS.

HANSELL (*Philadelphia Polyclinic*, January 20, 1894) calls attention to the occasional danger of prolonging the use of atropine in cases of iritis, especially of such variety where there has been abundant exudation, and recommends a solution of eserine strong enough to break off the capsular attachments, but weak enough to avoid undue excitement of the ciliary structures. He has found disks each containing $\frac{1}{1000}$ grain convenient. The effects of the drug must be carefully watched, for if it is too strong, or too frequently repeated, a relapse of the iritis may be expected.

A MODIFIED OPERATION FOR EXTRACTION OF CATARACT.

T. E'GAPPA (*Indian Medical Gazette*, December, 1893) lacerates the capsule of the lens as the first step in the operation for extraction of cataract. He believes the best part of the cornea at which to insert the needle is from two to three millimetres above and to the inner side of the outer extremity of the horizontal diameters of the cornea. The pupil is fully dilated and the incision is a crucial one. The lens is then extracted through an ordinary corneal incision, and usually without iridectomy.

THE ACTION OF CARBONIC OXIDE ON THE EYE.

M. SCHMITZ (abstract of original paper published in the *Annales d'Oculistique*, November, 1893) observed ocular disturbances in two cases of severe poisoning by carbonic oxide. The first patient was unconscious for twenty-four hours, and paralyzed in his limbs for three days. On the fourth day vision equalled one-sixth; there was intense photophobia, and later the field of vision was contracted; all colors were distinguished at the fixation point. Gradually the symptoms improved until the end of the fifth month, when they were normal. Ophthalmoscopically the veins were distended and the arteries contracted. After the accident there was anæsthesia in both hands and both forearms. In the second case there was also concentric contraction of the visual fields and diminution of central acuity, but the symptoms varied considerably at different examinations. There was also anæsthesia of various portions

of the skin of the body. The author believes that in both cases he dealt with a form of toxic hysteria.

THE EMPLOYMENT OF INJECTIONS OF ORGANIC EXTRACTS IN THE TREATMENT OF DIFFERENT FORMS OF ATROPHY OF THE OPTIC NERVE.

BOURGON (*Annales d' Oculistique*, November, 1893), after referring to the article of Galtier on the treatment of gray atrophy of the optic nerve by the injection of organic extracts, in which he had apparently seen a good result, details four observations of his own,—the first, a case of white atrophy, probably of intracranial origin; the second, one of atrophy in a tabetic patient; the third, also intracranial in origin; and the fourth, of uncertain origin, perhaps diabetic. The interesting point of the report is that, although one of the patients was undoubtedly tabetic, and the doses of the liquid employed were very considerable, the results were absolutely negative, and, therefore, he doubts any efficacy in the Brown-Sequard method in so far as optic atrophy is concerned. He mentions, in passing, that he has had better results in two cases by the use of antipyrin, as recommended by Valude, than by any other medicament.

CLINICAL RESEARCHES ON PARALYSIS OF THE OCULAR MUSCLES, AND THEIR TREATMENT.

DR. J. D. MELLO VIANNA (Paris Thesis, 1893) has published a brochure on this subject, and the following abstract of the chapter on treatment appears in the *Archives d' Ophthalmologie*, November, 1893:

When syphilis has been established, or is only suspected, and even where the etiology is uncertain, the treatment should begin with mercury, preferably the hypodermic method, which may be safely employed if rigorous antisepsis is practised. The formula of Professor Panas follows:

℞ Biniodide of mercury, .40 centigramme;
Sterilized water, 100 grammes.

The injections should be made with a carefully sterilized Pravaz syringe, and the area selected for puncture should also be properly disinfected. The injections should be intramuscular, and the needle made to penetrate some depth into the tissues. The region of the buttock is preferred.

The formula of De Wecker is also given as follows:

℞ Corrosive sublimate, 1 gramme;
Chloride of sodium, 2 grammes;
Acetate of morphine, .40 centigrammes;
Distilled water, 100 grammes.

A Pravaz syringeful contains about 1 centigramme of sublimate. The dose is one injection per day.

TENOTOMY OF THE OCULAR MUSCLES.

An editorial in the *Medical News*, after referring to the fact that in the Ophthalmic Section of the Pan-American Medical Congress there was a manifest inclination, with a few exceptions, towards a more conservative and therefore medical treatment of heterophoria, proceeds as follows:

It is also fast coming to recognition that, owing to the very peculiar and complex interrelations and functions of the ocular muscles, as well as from a hundred other reasons, these muscle-troubles, supposed and so-called, are often not muscle-troubles at all; they are not always peripheral in origin or in essence, but are often of central origin. The malfunction resides in the innervation and the innervating centres. For example, upon a patient with eighteen degrees of esophoria, complete tenotomies of both internal creti have produced temporary muscle-balance, but in ten days the eighteen degrees reappeared, and the man stood just where he was before the operation.

In the first place, many of these inco-ordinations are due to general disease, such as anæmia, tabes, pelvic disorder, syphilis, etc., and require proper general treatment to re-establish healthful normality of function. One of the speakers of the Congress detailed a number of cases that had come under his observation, in which operations on the muscles had been worse than useless, because the paresis was plainly due to cord-disease.

Then, again, a large number of these incoordinations are due to the uncorrected ametropia. The tenotomist, despite himself and despite his remonstrance, ignores the fact or depreciates its importance, that the refractive error produces muscular defect, and the correction of the ametropia either relieves the reflex symptoms or cures the muscular unbalance. It is perfectly possible, nay, it is highly probable, that hyperopia and hyperopic astigmatism may be the chief etiological factors in the production of *both* esophoria and exophoria. A single cause may produce diametrically opposite results, according to its strength and according to the circumstances and conditions among which it operates.

Finally, in a large balance of cases not due to general disease, or to ametropia, it is certain that gymnastic exercises may re-establish the desired muscular equilibrium. All success by this method depends upon the kind of exercise and how it is carried out. In the case of other paretic muscles,—supposing, for argument's sake, that the muscles are primarily at fault,—we do not cut them, but we endeavor to stimulate them to healthy action and development by gymnastics, by hygienic and physiological measures. Why not also do the same with the muscles of the eye?

There is a proper place for tenotomy for insufficiency, but it should be resorted to only after the foregoing methods have been tried.

ON CERTAIN DANGERS ATTENDING THE USE OF ATROPINE AND THE EMPLOYMENT OF SCOPOLAMIN.

Dr. Haskett Derby (*Boston Medical and Surgical Journal*, December 28, 1893), after calling attention to the well-known dangers of atropine and its power to precipitate an attack of glaucoma, as well as produce severe constitutional disturbances, refers to scopolamin originally introduced by Raehlmann. He quotes some observations with this drug made by Dr. Haskell of the Massachusetts Charitable Eye and Ear Infirmary, a one-fifth-per-cent. solution of the drug having been used in seven cases. The first column gives the age, the second the number of minutes that elapsed before any effect was perceptible, the third the minutes required for maximum dilatation, and the last the number of hours that elapsed before the pupil again became normal.

9	8	40	51
8	16	35	60
17	10	21	72
12	9	30	80
9	10	25	60
20	10	20	80
12	12	40	90

Raehlmann's conclusions, already abstracted in the columns of the Gazette, are quoted, and Derby thinks that if further experience corroborates them, it is likely that scopolamin may supersede atropine.

THE EYE TREATMENT OF EPILEPTICS.

Dr. Ambrose L. Ranney, (*New York Medical Journal*, January 20, 1894), comes to the following conclusions as the result of his observations on the eyes of epileptics:

1. In epilepsy he regards an examination of the eyes (for errors of refraction) and of the eye muscles (for heterophoria) as the first and perhaps the most important step towards a search for sources of reflex nervous disturbance.

2. No final conclusion should be reached regarding the presence or absence of heterophoria until sufficient time, patience, and skill have been bestowed upon the investigation by one who is thoroughly familiar with the practices and later methods for the determination of "latent" heterophoria.

3. All preparations of bromides and other drugs that tend to control the seizures should be withheld, as a rule, from an epileptic patient until all possible sources of reflex irritation have been scientifically sought for and, as far as possible, relieved.

There may be justifiable reasons, to his mind, for exceptional departures from this rule; but he wishes to emphatically raise his voice in protest against the prevalent system of drugging epileptic patients from the date of the appearance of the first fit without any attempts being made to ascertain what the cause of the epilepsy may be.

4. He strongly advocates the employment of atropine in every case before a final decision is reached regarding the refraction of an eye.

He also believes that in epileptic cases it is wise to insure a full correction of any existing astigmatism (by glasses to be worn constantly in well-fitted spectacle-frames), and as near a full correction by spherical glasses of any latent hypermetropia that is detected as the patient can be made to tolerate, even if atropine has to be instilled at intervals into the eyes of the patients for several weeks to prevent a return of ciliary spasm.

He has observed many cases of chronic epilepsy that have been relieved of all convulsive seizures so long as the full effect of atropine upon the ciliary muscle was maintained.

5. No promises that absolute cure can be effected by eye treatment should ever be made to an epileptic; but it is usually safe for the physician and patient to hope that a radical correction of marked heterophoria and abnormal refraction will eventually be followed by decided and permanent benefits.

6. The results in all cases thus far treated by him seem to warrant the conclusion that at least ninety per cent. of chronic epileptics have been better without bromides, after a satisfactory correction of their eye defects, than they ever were when subjected to the influence of drugs. Some have apparently been cured.

It should be remembered that a victim to

chronic epilepsy who is rendered by any treatment as free from the attacks without the bromides as when under their deleterious influence has been very markedly benefited; again, that if a marked diminution of the attacks has been effected, the patient has double cause for gratitude; finally, that if the attacks are arrested *in toto* without drugs, it is to-day one of the most remarkable facts recorded in medical literature.

7. In cases where negative results have been observed in spite of a satisfactory investigation and correction of marked heterophoria and abnormities of refraction, he would deem it wise before resorting to drugs for epileptic seizures to search for other sources of reflex peripheral irritation (such, for example, as bad teeth, phimosis, rectal or uterine disease, scars, etc.).

Furthermore, the detection of chronic kidney disease, syphilis, organic brain lesions, and depression of the skull is most important prior to the beginning of eye treatment or a search for other forms of peripheral reflex disturbances.

8. The treatment of heterophoria by prismatic glasses alone is not curative; nor, in his opinion, are very marked beneficial results to be expected from them. Prismatic glasses are valuable aids, however, in determining the existence and amount of "latent" heterophoria prior to the radical correction of such defects by graduated tenotomies.

THE TREATMENT OF ULCERS OF THE CORNEA BY CURETTING ("RACLAGE") AND ANTISEPTICS.

FROMAGET (*Annales d' Oculistique*, October, 1893), communicated a paper on this subject to the Society of Ophthalmology of Bordeaux, and comes to the following conclusions:

Raclage, with antiseptic irrigation and dressing, is indicated,—

1. In persistent phlyctenular or traumatic ulcers which, accompanied by intense reactionary symptoms, have no tendency to heal or induce infection.
2. In asthenic ulcers.
3. In infectious ulcers of small volume.

It is useless and consequently not indicated:

1. In recent and superficial ulcers when there is no infection.
2. In ulcers of granular conjunctivitis.
3. In infectious ulcers of large volume with infiltration of the cornea.

It is necessary to combine paracentesis of the cornea with raclage in the following cases:

1. Increased depth of the anterior chamber and rise of the intraocular tension.
2. Danger of perforation.
3. Existence of obstinate hypopyon.

ON THE ACTION OF ELECTROLYSIS UPON THE DEVELOPMENT OF STAPHYLOCOCCUS AND STREPTOCOCCUS.

VALUDE (*Annales d' Oculistique*, October, 1893) makes the following abstract of an article with the above title published by Lagrange. Inasmuch as electrolysis is used to cure dacryocystitis, it was sought to determine the influence of this electrical action on the microorganisms which multiply in the lachrymal ducts and are the first cause of dacryocystitis. The experiences of Lagrange have shown him that electrolysis possesses a definite microbicidal action. If the micro-organisms are not absolutely destroyed, their virulence is greatly lessened. The author thinks that the bactericidal action is due to the chemical electrolytic decomposition and to the direct influences of the gases thus produced upon the micro-organisms. It is known, indeed, that electrolysis of the lachrymal ducts is accompanied by the production of an abundant foam. The gases thus developed act powerfully upon the vitality of pathogenic agents.

THE TREATMENT OF EPIPHORA.

VALUDE (*Annales d' Oculistique*, October, 1893) submits the following abstract of a paper published by Bettremieux (*Journal d' Oculistique du Nord*, February, 1893): In stubborn epiphora, instead of attacking the principal or accessory lachrymal glands, as is now usually done, Bettremieux performs galvano-cauterization of the excretory ducts of the lachrymal glands at their openings into the conjunctival cul-de-sac, so that the former become obliterated and the epiphora ceases. This is his method of procedure: After cocainization, the superior eyelid being quite reversed, the patient looking downward and inward, he performs a number of superficial puncture cauterizations on the surface of the palpebral lachrymal gland situated in the external part of the upper cul-de-sac of the conjunctiva. The patient feels no pain at the time of cauterization, and later suffers very little or not at all. Sometimes a slight localized conjunctival injection is produced, with scarcely ever any swelling. These cauterizations should be made repeatedly at intervals of several days. According to the author, the cicatricial pro-

cesses which are thus induced ought to cause obstruction or, at the very least, contraction of a certain number of excretory ducts of the lachrymal gland. Although it is not possible to touch with the point of the platinum needle repeatedly and unerringly upon the openings of these canals, it is reasonable to admit that the cauterization of the portion of the cul-de-sac corresponding to the seat of the excretory duct ought to be an obstacle to the flow of the lachrymal fluid, and to determine secondarily a certain atrophy of the gland as may in reality be produced after accidental cauterization, or in consequence of the cicatricial lesions which follow certain types of granular or diphtheritic conjunctivitis.

A NEW TREATMENT OF GLAUCOMA.

KNIESS (*Annales d' Oculistique*, August, 1893) succeeded in checking glaucomatous accidents by making a circular incision in the cornea and including the iris in it. This irido-sclerotomy proves useful, especially in severe forms of glaucoma. Hernia of the iris, always to be dreaded in ordinary sclerotomy, is thus avoided. This operation may be recommended in all cases where iridectomy would have been deemed necessary.

THE ABUSES OF COCAINE IN NASAL TREATMENT.

A good note of warning and sharp criticism was read on this subject by WILKINSON, of Omaha, at the Milwaukee meeting of the American Medical Association, and is published in the *Journal* of November 25. His strictures are too largely directed to the employment of the drug in various proprietary "catarrh snuffs," and might well have been extended to its medical employment. The numerous, and already sometimes disastrous, cases of the formation of the cocaine habit which had fallen under his notice prompted him to his suggestion that medical men should unite to combat promptly and vigorously this growing evil, and to secure legislative bars to the vending of such preparations. His protest might have been applied with nearly equal force to the undue use, and still more to the prescribing, of cocaine by the profession. It has from the first been a matter of real surprise that a drug of such potency had not more of deleterious effect; but he who has used it much and seen no bad results speaks ill for his observation. Close and conscientious observers have almost always learned to be increasingly cautious in their own use of it, and have often wholly forsworn giving it into the hands of a patient. Its great value in the investigation and treatment of nasal troubles will always make it tempting to resort to its use more often than is best, and it is well that those who are continually seeing its dangers and actual damage should insist upon an employment of it as limited and cautious as is or ought to be the rule as to morphine.

COCAINE-POISONING: REPORT OF A CASE WITH ALARMING SYMPTOMS.

DR. ALBERT R. BAKER (*American Journal of Ophthalmology*, November, 1893) reports a case of operation upon the nasal duct under the influence of cocaine, with the symptoms which follow: Preparatory to slitting the canaliculus, he instilled into the eyes two drops of a six-per-cent. solution of cocaine, which he had used the morning of the same day without accident upon a boy about twelve years of age. After waiting two or three minutes, the canaliculus was slit and three drops injected into the lachrymal sac. He then attempted to pass a lachrymal probe, but as the patient still complained of pain, three more drops were injected, making eight in all. Almost instantly the patient complained of feeling queer and commenced to talk incoherently, soon becoming unconscious, and developing clonic convulsions of all the extremities. Respiration was frequent and sighing. The face was flushed, the pulse accelerated, irregular, varying from 120 to 50 a minute, but at no time very weak. The convulsions lasted for over two hours. Inhalations of ammonia, and later on of nitrite of amyl, were tried without apparent benefit. A hypodermic injection of brandy was also given. As the patient emerged from the unconscious condition she became slightly delirious, requiring the constant services of two or three attendants to prevent injury to herself or to others. Her mind was filled with the most extravagant hallucinations, in many respects resembling those produced with duboisia or cannabis indica. At one time she would see many objects on the floor; at another be sewing, and then she would imagine bodily harm, all the time talking and gesticulating as vehemently as in acute mania. These symptoms continued for about six or eight hours, and were so persistent and violent that he did not feel justified in removing her from the office before ten o'clock in the evening. She slept but little during the night, but was recovered in the morning. As soon as she could swallow, aromatic spirits of ammonia were given, and strong coffee and

inhalations of ether were tried sparingly to control the violent maniacal symptoms. It is possible, in Dr. Baker's estimation, that more heroic use of these remedies, or a hypodermic injection of morphine might have allayed the very embarrassing symptoms. One of the most persistent hallucinations of this patient was that she was being delayed for improper purposes, although no definite erotic symptoms were evident, such as have been reported by Richardson in one case. Dr. Baker's paper concludes with a partial analysis of cases of cocaine-poisoning, and particularly those which have resulted in death.

THE TREATMENT OF PURULENT (GONOCOCCAL) CONJUNCTIVITIS.

BURCHARDT (*Centralbl. f. Prakt. Augenheilk.*, November, 1893) does not believe in the use of cold compresses and cauterization of the mucous membrane with strong solutions of nitrate of silver, but advocates the frequent irrigation (sterilization) of the conjunctival culde-sac. For this purpose he uses a one-sixth-per-cent. or one-tenth-per-cent. solution of nitrate of silver. If there is much pus, he first irrigates with a five-per-cent. solution of aqua chlorinata, and follows this with the nitrate of silver.

SINGLE-SUTURE OPERATION FOR ADVANCING THE RECTUS.

DR. A. E. PRINCE (*Archives of Ophthalmology*, October, 1893), after referring to his well-known paper on double-suture operation for advancing the rectus muscle, together with the single-suture method for accomplishing the same purpose, describes the latter operation a second time and more completely. The following indications must be fulfilled:

1. Secure an unyielding anterior fixation point in line with the muscle to be advanced by utilizing the dense episcleral tissue.

2. Secure the muscle in such manner that its escape and retraction may not occur after the tendon has been exsected and the muscle released from the grasp of the advancement forceps.

3. Secure the suture with such a knot as will permit of its being loosened for the purpose of increasing or diminishing the tension or the introduction of another suture farther back. The method is as follows: The conjunctival incision is made over and parallel to the attachment of the tendon of the muscle to be advanced. The tendon is secured by an advancement forceps, separated from the sclera, and advanced, allowing the conjunctiva to retract. Two slender eye-needles on either end of a No. 3 iron-dyed silk suture are passed from within outward, perforating the capsule, muscle, and conjunctiva at a variable point, depending upon the amount of displacement to be effected, thus securing the middle portion of the muscle in a sling from which it can neither slip nor escape. With the exception of cases requiring a small amount of advancement at the muscle, or those in which the suture is used as a control to prevent an over-correction following a tenotomy, the portion of the tendon in the grasp of the forceps is exsected about two millimetres anterior to the sling. The sclera being now fixed, preferably with Critchett's short fixation forceps, an unyielding anchorage in the form of a fibrous pulley is secured in the line with the rectus by introducing either needle into the dense episcleral tissue two millimetres from the corneoscleral junction. Both ends of the suture are now brought together, forming the first portion of a surgical knot, and tied to effect the slight over-correction. This may now be secured or provisionally held by the application of a bow until muscular tonicity shall have returned, thus enabling the effect to be modified at any time before adhesion has taken place. The suture is permitted to remain four days, unless it is desired to diminish the effect, which may safely be done after forty-eight hours by removing the suture and cautiously opening the wound.

OPERATIVE TREATMENT OF THROMBOSIS OF THE LATERAL SINUS.

A noteworthy communication upon this important topic was made to the Otological Section of the British Medical Association by ARBUTHNOT LANE, as reported in the *Brit. Med. Journ.*, No. 1706. He reports ten cases with nine recoveries, in which he laid open the sinus, ligated the internal jugular in the neck below any thrombus there encountered, and irrigated thoroughly the suppurating surfaces. This operation, which is generally accredited to the suggestion of Victor Horsley, although advised by Zaufal in 1880, has been practised with varying results by a number of surgeons, general and special, several of the successes having been very brilliant. No such group has hitherto been reported by one operator, and his results are likely to bring it into more favorable notice and more frequent employment by the general surgeon. It is, therefore, very fitting to direct attention to the long recognition of these cases and their fairly suc-

cessful treatment by the aural surgeon, as witness the publications of Schwartze, Hecke, Moos, and a number of others who have encountered instances of the affection apparently more severe than those of Lane, and brought an equal proportion of them to as speedy and perfect healing by simple mastoid trephining, or at times without any operation. Those also who have been less fortunate, and have secured autopsies upon their cases, have found at times total spontaneous disappearance of both clot and phlebitis from jugular and sinus, although every rational sign of their former presence had been distinct. It is to be hoped, therefore, that the surgeon will consider well the curative powers of nature, as well as the possibilities and value of his intervention for the removal of purulent foci in sinus or brain. The proportion of cures will doubtless be somewhat reduced by such conservatism, but it will be a less open question, how many of the cases have been operated upon needlessly; for it is not invidious to note that few surgeons have met more than one or two cases demanding operation, while Victor Horsley seems not yet to have employed in a single instance the operation which he is commonly credited with devising.

SURGERY OF THE URETERS.

As a result of a clinical, biographical, and experimental research, VAN HOOK (*Journal of the American Medical Association*, vol. xxi., No. 26) announces the following conclusions to an extremely able and scholarly paper:

1. The extra-pelvic portion of the ureter is most readily and safely accessible for exploration and surgical treatment by the retro-peritoneal route.

2. Hence all operations upon the ureters above the crossing of the iliac arteries should be performed retro-peritoneally, except in those cases in which the necessity for the ureteral operation arises during laparatomy.

3. The intra-pelvic portion may be reached by incision through the ventral wall, the bladder, the rectum, the vagina in the female, the perineum in the male, or by Kraske's sacral method.

4. The ureter is not only exceptionally well protected from injury, but by its elasticity and toughness resists violence to a remarkable degree.

5. The histology of the ureters furnishes most favorable conditions for the healing of wounds.

6. Longitudinal wounds of the ureter at any point heal without difficulty in the absence of septic processes, under the influence of ample drainage.

7. In all injuries where the urine is septic before the operation, or where the wound is infected during the operation, drainage must be effected.

8. The chemic composition and reaction of the urine must be studied in all injuries to the ureter, the urine being rendered acid, if possible, and the specific gravity kept low.

9. The pelvis of the ureter is, *cæteris paribus*, the most favorable site for wounds of the ureter, since scar-contraction is not so likely there to be productive of ill results.

10. In aseptic longitudinal wounds of the ureter occurring in the course of laparatomy, suture may be practised and the peritoneum protected by suture.

11. Transverse wounds of the ureter involving less than one-third of the circumference of the duct, should be treated by free drainage (extra-peritoneal), and not by suture.

12. In transverse injuries in the continuity of the ureter, involving more than one-third of the circumference of the duct, stricture by subsequent scar-contraction should be anticipated by converting the transverse into a longitudinal wound and introducing longitudinal sutures.

13. In complete transverse wounds of the ureter at the pelvis, sutures may be used if the line of union be made as great as possible.

14. In complete transverse injuries of the ureter in continuity, union must not be attempted by suture.

15. In complete transverse injuries of the ureter in continuity, union without subsequent scar-contraction may be obtained by the writer's method of lateral implantation, as described.

16. In complete transverse injuries of the ureter very near the bladder, the duct may be implanted, but with less advantage, into the bladder directly.

17. At the pelvis of the ureter, continuity after complete transverse injury may be restored by Kuester's method of suture, providing the several ends can be approximated by slightly loosening the ureter from its attachments.

18. Rydgier's method of ureteroplasty in such injuries may be tried if other methods cannot be utilized. The primary operation should at least fix the ends of the tube together as nearly as possible.

19. In both transperitoneal and retroperitoneal operations the ureteral ends can be approximated by Van Hook's method even after the loss of about an inch of its substance.

20. The use of tubes of glass and other materials for the production of channels to do duty in place of destroyed ureteral substance must be rarely satisfactory, and even if temporarily successful, the duct is almost sure to be choked by scar-contraction.

21. The implantation of the cut ends of a ureter into an isolated knuckle of bowel is objectionable,—1, because the bowel is not aseptic; 2, because the operation is too dangerous.

22. In injuries of the portion of the ureter within the pelvis, with loss of substance, the ureter should be treated as follows: If possible, the continuity of the ureter should be restored by the writer's method.

23. If this is not possible, the ureter, if injured in vaginal operations, should be sutured to the base of the bladder with a covering of mucous membrane as far forward as possible, with a view to a future implantation or formation of vesico-vaginal fistula with kolpokleisis.

24. In injuries to the pelvic ureter during laparotomy, where the continuity cannot be restored, and where temporary vaginal implantation cannot be effected in the female, or vesical implantation in the male, the proximal extremity of the duct should be fastened to the skin at the nearest point to the bladder.

25. In ventral ureteral fistulæ opening near the bladder, the ureteral extremity may in some instances be planted directly into the bladder without opening the peritoneum.

26. In such cases where the ureter will not reach the bladder a flap may be raised from the anterior vesicle wall and reflected upward, extra-peritoneally, to meet the ureter and form a tubular diverticulum.

27. Such a flap may be so elongated by a preliminary operation to transplant the peritoneum back of the fundus, or by accurately suturing it there at a single sitting, that median ventral fistulæ of the ureter may be cured if they open at any point an inch or more below the umbilicus.

28. Symphysotomy is a valuable and justifiable preliminary step in these plastic vesical operations.

29. It is legitimate when both ends of a cut ureter open upon the abdominal wall to try Rydgier's method.

30. Implantation of one or both ureters into the rectum is absolutely unjustifiable under all circumstances, because (1) the primary risk is too great; (2) there is great liability to stenosis of the duct at the point of implantation; (3) suppurative uretero-pyelo-nephritis is almost absolutely certain to occur, either immediately or after the lapse of months or years.

31. Ligation of the ureter to cause atrophy of the kidney is unjustifiable.

32. Extirpation of a normal kidney for injury or disease of the ureter is absolutely unjustifiable, except where the ureter cannot be restored in one or other of the ways cited.

THE TREATMENT OF INTESTINAL OBSTRUCTION.

In the discussion of this subject at the annual meeting of the British Medical Association, PAGE holds that after careful examination under chloroform and failure to detect the seat of trouble, immediate abdominal section is indicated.

HUTCHINSON stated that, as a result of wide inquiries among his professional friends, he had a strong impression that laparotomy for intestinal obstruction of an unknown origin was very seldom successful, nor was he quite free from the suspicion that the operation in itself presented a cause of danger. He held that it was generally admitted at the present day, with all our improvements, that the fatality from strangulated hernia operations ranged from twenty-five to fifty per cent., we being in this respect not a whit better than our forefathers, no modern surgeon affording the excellent statistics of Mr. Luke; this despite the fact that many cases are operated on which would formerly have been reduced. Hence it would seem that, taken as a whole, the fatality of strangulated hernia has increased. Arguing from this, Hutchinson held that if it should become a common practice in intestinal obstruction to operate early and without attempting to relieve by other means, the fatallty in this class of cases would be greatly increased. He himself strongly urged the importance of taxis, and was always accustomed to use all the force that his hands possessed, and often regretted that they tired so soon. Death, after forcible taxis, is extremely rare. Three patients in his practice perished after reduction of femoral hernia, but not one for inguinal. In the last twenty years he has strongly advocated abdominal taxis. This he applied by putting the patient under full anæsthesia and vigorously kneading the abdomen, the intestines being pushed from side to side. The patient is then turned on his belly, and in this position is well shaken; lastly, he is held head downward and again shaken up and down. Enemata are also administered with the body inverted. Many successes followed this manipulation. In some

instances obstruction has lasted for many days. Diagnosis of the precise lesion, excepting in the case of intussusception, is usually an impossibility. Obstruction from gall-stones are cases in point. Operations in these have been repeatedly performed, never with a correct diagnosis beforehand, and often with fatal result; whereas, if left alone, nearly all these cases recover.

HUME agreed with Hutchinson as to the present unsatisfactory result of operation in cases of internal obstruction, but took exception to taxis as increasing the vulnerability of the peritoneum.

COUSINS had two successful cases from following the Hutchinson method of taxis.

MORISON stated that he had seen four cases of hernia reduced *en bloc* with four deaths. He holds that herniotomy is very much less fatal than it was formerly, and that it is distinctly safer than vigorous taxis. In regard to internal intestinal obstruction, he stated that of all cases he had operated upon, when seen post mortem, intussusception excepted, he had never observed one which he could imagine likely to be benefited by such treatment as Mr. Hutchinson suggests. Morison showed that acute typhlitis and perityphlitis sometimes present the symptoms of obstruction, and called attention to the dangers of Hutchinson's manipulations in such cases. In chronic and incomplete cases of obstruction he holds that the best results will be obtained by washing the stomach out, the administration of nutrient enemata, the free use of opium, and stopping of supplies by the mouth. Nearly all acute cases die; certainly not five per cent. recover. He holds, however, that operative treatment will soon demand first consideration.

RIVINGTON called attention to the fact that the heavy mortality of laparotomy for obstruction is due to the fact that the surgeon is called in too late. Hence it is that Hutchinson can truthfully state that at the London Hospital there has not been a recovery from an abdominal section for obstruction, save in a single case of strangulation by a band. When the number of cases of operation within twenty-four hours have been put on record it will be fair to compare the results obtained by abdominal taxis and delay.

NEWMAN, as did nearly all the participators in this discussion, strongly urged the early administration of chloroform and careful examination of the abdomen during the relaxation accompanying this drug, followed by an immediate exploratory incision. He holds that the opening should be small, and if there is failure to find the seat of obstruction through this opening, the bowel should be short-circuited by Senn's method, or enterostomy should be performed. When the bowel has been emptied of its contents, then the abdomen may be freely opened and the nature of the obstruction discovered and treated according to the individual requirements of the case.

RESECTION OF THE RECTUM AFTER THE REMOVAL OF MALIGNANT GROWTHS.

MARCY (*Matthews's Medical Quarterly*, vol. i., No. 1) holds that as soon as the diagnosis of rectal cancer is established, while the invasion of the parts is yet limited and local, inguinal colotomy is to be performed. The operation must be performed in two different stages,—that is, a loop of the descending colon is to be fixed in the abdominal wound, and there allowed to remain for several days, until the peritoneum is shut off by adhesive inflammation, before the intestine is opened. Performed in this way, colotomy is an operation of comparatively little danger. The lower segment of the bowel is thus put at rest, emptied of its contents, and easily disinfected.

This having been accomplished, an incision is made in the median line posteriorly to a point just below the end of the coccyx. The coccyx and a sufficient portion of the sacrum are removed to permit ready access to the bowel. The intestine is first freed posteriorly for about two-thirds of its circumference, and the peritoneal cavity is opened sufficiently to allow of easy manipulation of the intestine. The rectum is now divided transversely at the lower border of the disease; the upper segment is split longitudinally along its posterior wall, thus not only exposing the diseased structures, but facilitating the dissection of the intestine from its anterior attachment, which, in the male, is the more difficult because of the intimate relationship of the parts to the prostate and the base of the bladder. When this dissection is effected, the bowel is divided transversely above that portion which has been invaded by the disease. A further division of the mesorectum is now made sufficient to loosen the attachment of the intestine, so that its upper portion may be readily brought down to the line of its inferior division. This having been accomplished, the continuity of the gut is restored by suturing, or, in the case reported by Marcy, the Murphy button, reinforced with a line of sutures. The peritoneal opening is then sewed, and the wound, according to Marcy, is closed without drainage. The discharge of the

button is insured by a silk suture secured to it and brought out through the anus.

The advantages obtained by the operation are the radical removal of the disease, which, when accomplished at a sufficiently early period, gives expectation of further exemption from it. The sphincter and the anal structures are retained uninjured in character and function. The external tissues are normally approximated, and the lesion of the sacrum gives very little, if any permanent disability.

Subsequent operation for the restoration of the intestine divided in the colotomy, and its replacement in the abdominal cavity, restores the bowel in its continuity and function.

APPENDICITIS.

ROBINSON (*Mathews's Medical Quarterly*, vol. i., No. 1) founds the diagnosis of appendicitis upon pain and tenderness in the region of the right iliac fossa, and vomiting, tympanitis, and temperature. The pain is appendicular colic, which may be due to the amount of peritoneal surface damaged by the invasion of the infective matter. The constipation, the tympanitis, and vomiting are reflex. Lameness is due to pressure on the lumbar plexus, and the sudden cessation of pain may denote that the foreign body has been expelled into the cæcum. Œdema may be induced, or hemorrhage, or phlebitis in the right iliac fossa. Robinson compares the appendix to the tonsils, stating that it is subject to similar temporary inflammations at the same ages in both sexes. It is lymphatic in structure. Its glandular element is large.

One-half the appendicitis is catarrhal or parietal, and should not require surgical interference. Relapsing appendicitis is not a dangerous malady. All suppurative and perforative cases of appendicitis should be operated on as soon as diagnosed.

As a reason for the greater frequency of the affection in males than in females, the author suggests that Gerlach's valve is larger in men than in women. Robinson states that he knows of two surgeons who have operated on seventeen cases of diffuse peritonitis following appendicitis, and in every instance with a fatal result. Treves says that eighty per cent. of cases of appendicitis get well spontaneously. Talamon says ninety per cent. get well without operation. Guttman treated medically one hundred cases, and four died.

Robinson finally closes his paper with the statement that observation and practice seem to teach less surgery on the appendix than formerly. Judgment is becoming more accurate as to what cases demand operation. The findings at autopsies would seem to limit operative work more and more.

APHORISMS IN THE TREATMENT OF SYPHILIS.

LANG (*Centralblatt für die Gesammte Therapie*, xii. Jahrgag, 1894), under the above heading, starts with the assertion that mercury and iodides are universally conceded to be antisyphilitics, and that the only difference of opinion lies in the time and the manner of using these drugs, and the period during which they should be continued. Sarsaparilla, he holds, is also of great value, so much so that many cases treated in vain by the specifics recover in an astonishing manner when this drug is administered. In extremely feeble cases he holds that the best results are often obtained by paying strict attention to diet and hygiene, by administering sarsaparilla, and then finally giving the specifics. He employs a strong decoction, the dose being 2 or 3 teaspoonfuls. The iodide of potassium, he believed, is often given in unnecessarily large doses; in ordinary cases, from 4 to 30 grains a day will answer. When it is necessary to be careful of the stomach the iodides are given by the rectum, 15 to 60 grains being dissolved in 8 to 12 ounces of warm water, milk, or nutrient enema. In one case Lang administered the iodides subcutaneously in the form of a fifty-per-cent. solution, using from 4 to 8 grains a day. The pain incident to this injection may be avoided by incorporating codeine with the iodide in the proportion of 1 to 2 parts to 100.

Mercury acts unfavorably in cases of cancer, tuberculosis, malaria, or degenerative processes in general. The hemorrhagic diathesis is also exaggerated by this drug. Exceptionally even very small doses of mercury produce fatal poisoning. Thus two or three rubbings have produced sloughing and ulceration of the bowel and death. Fournier reports a case treated by him some years ago which showed no especial reaction to mercury, but, returning on account of recurrent brain syphilis, suddenly developed symptoms of poisoning under inunction cure which very nearly resulted fatally. Attention is also called to the chronic form of mercuric intoxication characterized by alteration in the nervous system. Even acute mercuric poisoning can occasion similar alterations. In some cases paralysis developed, in others polyneuritis.

Lang administers pills which should be made up fresh according to the following formula:

℞ Protiodide of mercury, gr. xxxii;
Extract of opium, gr. viii;
Lanoline, gr. xxiv;
Milk-sugar, gr. lxxii.
Make 50 pills.

Or, calomel or bichloride of mercury may be used in appropriate doses. Iodide of potassium is given in the same way.

Or,

℞ Potassium iodide, ʒiiss;
Milk-sugar, ʒss;
Lanoline, gr. xlviii.
Ft. pil. No. 50.

Or,

℞ Arsenous acid, gr. iv;
Milk-sugar, ʒss;
Lanoline, gr. xlviii.
Ft. pil. No. 100.

Of the iodide pills, 3 to 15 are taken daily.

The inunctions afford an extremely powerful means of influencing syphilis, although they are open to the same objection which obtains against dosage by the mouth,—*i.e.*, the quantity absorbed is never definitely known. It is probable that a certain amount of mercury remains *in loco* for some length of time and is gradually taken up. It is difficult to account on other grounds for stomatitis developing weeks after the cessation of inunction cure. Absorption is equally uncertain in hypodermic injection. Unfortunately, most of the injection masses are so composed that the active principle, being heavy, sinks to the bottom, and, as Ullmann says, often a difference in strength of ninety per cent. occurs between two injections of the same bulk. The author uses a fifty-per-cent. gray oil, of which he injects at one time .05 gramme, and repeats the injections at intervals of three or four days. He selects the subcutaneous tissues of the interscapular region, as in the gluteal region there is danger of striking veins. His first injection is made at the base of the neck, an inch to the left of the middle line; each following injection is made an inch lower down until six are placed, when the skin on the other side of the central line is employed in the same manner. As a first treatment from eight to twelve such injections are required. Recurrences require from four to eight. Exceptionally, more than twelve injections may be needed. In this case the tissues are selected further to one side of the line of the vertebræ. This is the treatment preferred by Lang.

OPERATIVE TREATMENT OF VARICOCELE.

KOEHLER (*Berlin Klin. Woch.*, No. 50, xxx. Jahr.) holds that when a patient with well-developed varicocele complains of pain which is not relieved by a well-fitting suspensory, when the enlargement of the veins is increasing, or when it is occasioning atrophy of the testicle and reflexly producing a condition of mental depression, operation is imperatively required. The method of choice consists in exposing the veins by free incision, isolating them, and tying each one separately high up and low down, the portion between these ligatures being excised. This excision should be combined with an operation having for its end shortening of the scrotum. This end is easiest attained by tying together the ligated vein ends above and below; then the vertical skin wound is stretched laterally so that it becomes transverse, and the wound is sewed in this position.

EXPERIMENTAL RESEARCH CONCERNING TETANUS IMMUNITY.

TIZZONI and CATTANI (*Berlin Klin. Woch.*, No. 51, xxx. Jahr.), on the basis of extended experimental study, state that rats and guinea-pigs, as representing animals exceptionally sensitive to the action of the tetanus bacillus, are no longer susceptible to the injurious effects of this micro-organism when injected with serum of high immunizing power. These serum injections are most efficient when they are administered immediately on the first appearance of symptoms of tetanus. Their effects are much less satisfactory, and are accomplished much more slowly when the local tetanic symptoms have reached their maximum and both local and general manifestations are present. The injections are quite without power when the infection has become general and death is near at hand.

The quantity of serum necessary to cure an animal already exhibiting tetanic symptoms is very much greater than that required to produce immunity. Thus, at least two thousand times the dose necessary for immunity is required to cure the developing disease, and correspondingly, when the symptoms of tetanus are well advanced, the dose must be still further increased, so that a quantity of the antitoxine one hundred and fifty times greater than that required at the beginning of tetanus is necessary in these cases.

The injection of the serum does not immediately affect the symptoms already developed; indeed, after a time, it slightly accentuates

them; but it has the effect of localizing them and of protecting the system at large from general infection. The symptoms, having been in the first place localized, subside very slowly, cure requiring several weeks.

Even though a dose considerably more powerful than that required to accomplish cure is given, it does not essentially hasten convalescence. The immunizing and curative power of the serum depends solely upon the amount of antitoxine it contains, and not upon the varying strength of this antitoxine. Hence it follows that satisfactory results can be obtained from serum of different potency provided the experimenter knows exactly what this potency is, and can gauge his volume dose accordingly. By precipitation with alcohol the serum loses none of its strength. Hence this precipitate can be used as effectively as can the serum. The serum of various animals, the horse and the dog for instance, is potent against tetanus, the essential point being to discover in each case the amount of antitoxin contained in a given volume. With serum of the highest immunizing power,—1 to 1,000,000,—if the results of experiments on animals can be utilized as a basis for the treatment of the human, about .7 cubic centimetre would be required for the cure of a man suffering from the first symptoms of moderately acute tetanus. If the disease is further advanced, 21 cubic centimetres will be required. If the alcoholic precipitate is employed, 5 to 6 centigrammes should be used in the first case, 10 to 12 grammes in the second.

TREATMENT OF CORYZA.

In the *Tribune Médicale* (27 année, 2e sér., No. 2) the following directions are given for the treatment of acute coryza: (1) Confinement to the room; (2) washing of the nose, three times daily, either by snuffing up the medicament, or by irrigation with infusion of eucalyptus leaves, or simply a glass of water as hot as can be borne, to which is added a soupspoonful of carbolic lotion, 1 to 20; (3) every two hours, after having blown the nose, a pinch of the following prescription:

℞ Chlorhydrate of cocaine, .10
Menthol, .20
Salicylic acid, .50
Boric acid, 4.
Powder of marshmallow, 10.
Make into fine powder.

(4) if the frontal pain is extremely severe, take three or four times a day a pill made up according to the following prescription:

℞ Crystallized nitrate of aconitine, gr. $\frac{1}{10}$;
Bromhydrate of quinine, gr. xvi;
Licorice powder.
Make ten pills.

(5) when there is irritation of the skin, smear the nasal orifice and the upper lip with

℞ Vaseline, 10 parts;
Boric acid, 1 part.

THE IMPENDING REVOLUTION IN MILITARY SURGERY CAUSED BY THE NEW INFANTRY RIFLE.

ANDREWS (*Journal of the American Medical Association*, vol. xxi., No. 26), after considering the changes which will be necessary in the position of surgeons and assistants at the time of battle,—changes necessitated by modern weapons,—contrasts the wounds produced by these weapons, particularly the rifle of small calibre, using smokeless powders, and injuries from the Springfield rifle used during the Civil War. He states, in a general way, that the old gun tears and shatters, the new one pierces; that the old projectile creates more shock and stops a wounded man more effectually; the new one causes less shock and less injury. It is evident that in future fighting most of the wounds will occur at the perforating and not at the shattering distance,—that is, between 350 and 1800 yards; hence field-surgery will have to deal with new conditions.

1. The wounds being smaller and less shattering, shock will be less, and the missiles will generally go through the body, and not require to be extracted.

2. The bullet, being so small, will have much less tendency to carry in with it patches of septic clothing and skin, and any bits that are lodged in the track of the wound will be so minute that a deep flushing of the wound with antiseptics will often sterilize the injury.

3. In cases where there is actually some chipping of a joint surface it will be possible to open the joint on the field, pick out the fragments, sterilize the cavity, and close it up, thus avoiding amputation.

4. It will in future be possible to avoid a large portion of the amputations and excisions which were formerly necessary.

5. In perforating wounds of the abdomen the tearing of the hollow viscera will be much diminished, giving a hopeful opportunity to save life by laparotomy on the field.

6. As prompt antisepticism of the wounds will be important, the hospital corps will have to be instructed how to do it before they bring in the patient.

7. The dispersion of the wounded over wide areas will increase the difficulty of prompt "first aid."

8. Field-surgery will be more scientific, and require a greater variety of operations; hence the poverty-stricken little cluster of instruments formerly furnished by the government to field-surgeons must have additions adapted to the new exigencies of the battle-field.

Reviews.

OPHTHALMIC NURSING. By Sydney Stephenson, M.B., F.R.C.S. (Edin.). With sixty-one illustrations.
London: The Scientific Press, Limited, 1894.

Dr. Stephenson informs us that his volume is the outcome of instruction given to nurses at the Ophthalmic School at Hanwell, and certainly those who have had the pleasure of listening to these lectures are to be congratulated upon the excellent instruction which they have received. It was high time that a book devoted especially to the nursing of diseases of the eye should be prepared, inasmuch as other branches of medicine have not been neglected in this respect. This one is thorough, practical, and sufficiently illustrated, although some of the plates, for example, the frontispiece, and the one illustrating the rods and cones, are fearfully and wonderfully made. This book may with propriety be read not only by nurses, but by physicians who are interested in the subject of ophthalmic operations, and we heartily commend it.

TEXT-BOOK OF NORMAL HISTOLOGY, INCLUDING AN ACCOUNT OF THE DEVELOPMENT OF THE TISSUES AND OF THE ORGANS. By George A. Piersol, M.D. With four hundred and nine illustrations, of which three hundred and fifty-eight are from original drawings by the author.
Philadelphia: J. B. Lippincott Company, 1893.

From the opening chapter, on "The Cell and the Tissues," to the appendix, containing a description of the most useful histological methods, this work is clear in expression, accurate in description, beautiful in illustration. Dr. Piersol's well-known skill as an artist has served him in good stead, and of the numerous plates scattered through its pages, a few of which are taken from well-known authors, more than one hundred and fifty are the work of his own clever pencil. Not only the original drawings, but those which have been selected, exactly meet the needs of the student in his efforts to learn and retain the facts of microscopical anatomy. As Dr. Piersol himself points out, they are sufficiently diagrammatic to be efficient aids in the comprehension of the text, but are none the less faithful likenesses of the original preparations. Among the many commendable features, there is one to which we would particularly call attention,—namely, that the preparations from which the drawings have been made, as far as possible, have been taken from human tissues.

In a book that is symmetrical, it is difficult to select, even if it were advisable, chapters that are particularly noteworthy; but, perhaps, owing to Dr. Piersol's early training as an ophthalmic surgeon, it is not unnatural that the section devoted to the eye and its appendages is singularly good, not only in its descriptions, but in the accuracy and beauty of its illustrations. For example, the plates illustrating a section through the ciliary region of the human eye, the human choroid, and the anterior segment of the human eye, including cornea, sclera, iris, ciliary body, and lens, have no superiors anywhere, and we doubt if they have their equals. This book at once takes front rank, and should be in the possession of every one who is interested in this important subject.

The publishers are to be congratulated upon the excellence of the book-making, the clear type, the satisfactory paragraphing, and the emphasizing by the use of heavy type of the important words in each section. A satisfactory index completes this capital text-book.

ESSENTIALS OF PRACTICE OF MEDICINE ARRANGED IN THE FORM OF QUESTIONS AND ANSWERS. By Henry Morris, M.D., with an appendix on the Urine, by Lawrence Wolff, M.D., and a formulary by W. M. Powell, M.D.
Philadelphia: W. B. Saunders, 1894.

The author tells us in his preface to the third edition that the book has proved of value to the medical student to such an extent that at the end of three years a third edition is called for. This fact seems to prove that it does fulfil the office for which its publisher and the author intended it, and that it contains a careful summary of most of the facts in connection with the study, if not of the application, of practical medicine. The statement, however, that the very latest treatment has been inserted is hardly accurate. For example, under

"Typhoid Fever" we are unable to find anything about the use of the Brand or cold-bath treatment. Under "Diphtheria" nothing is said of the employment of peroxide of hydrogen locally, and the dose of corrosive sublimate, which is recommended, has been criticised as excessive,—namely, $\frac{1}{80}$ of a grain every two hours. Other therapeutic points are discussed in a similar manner. In regard to etiology, nothing is said under "Erysipelas" of the fact that the disease is due to micro-organisms, but we are told that it is "due to a special poison, and is slightly contagious."

OUTLINES OF PHYSICIAL DIAGNOSIS OF THE THORAX. By A. M. Corwin, A.M., M.D.
Chicago: W. T. Keener Co., 1893.

This is a little book bound in a pliable cover, small octavo, containing one hundred and twelve pages, and is intended as a tree upon which the student may hang the ideas which he learns in the study of physical diagnosis. We have no doubt that to those students who follow Dr. Corwin's course it will be a useful guide and aid.

CLIMATES OF THE UNITED STATES IN COLORS. By Charles Dennison, A.M., M.D.
Chicago: W. T. Keener Co., 1893.

This small book is composed of a large number of maps showing the direction of the wind, the humidity, temperature, cloudiness, and rainfall of the entire United States, with the object of providing the physician and others with a reliable guide in the selection of a climate, or in the prognostication of storms. The fact that so careful a worker as Dr. Dennison has prepared these maps is a sufficient guarantee of their accuracy, and the popularity of them in previous editions has shown that this unusual way of providing medical information has proved popular.

Any one who is called upon to determine upon the climate to which a patient should go should be possessed of this volume.

THE TECHNIQUE OF POST-MORTEM EXAMINATION. By Ludwig Hektoen, M.D. Illustrated.
Chicago: W. T. Keener Co., 1894.

In this small octavo of one hundred and seventy pages, Dr. Hektoen has given the student a very valuable manual, which will be of use to him for reference, should he be wise enough to make as many post-mortems as possible after the diploma has been conferred. The method of opening the various cavities of the body and of examining the organs macroscopically, together with the incisions which should be made for the exposure of important parts of these organs, are all clearly detailed, and it is evident that the illustrations have been taken from the post-mortem table direct, and are not merely theoretical diagrams. It is always a pleasure to review a book which is of value, and a still greater one when the reviewer is thus given an opportunity of praising the writings of one who has contributed so much interesting and valuable material to the study of pathology in America.

A PRACTICAL TREATISE ON DISEASES OF THE SKIN FOR THE USE OF STUDENTS AND PRACTITIONERS. By James Nevins Hyde, A.M., M.D.
Philadelphia: Lea Brothers & Co., 1893.

America is as fortunate in the number of its eminent dermatologists as is Germany. The text-books which have been written by Duhring, Taylor, and Hyde have done more than anything else towards rendering the study of this subject attractive and profitable. The third edition of Dr. Hyde's book possesses all the advantages which the previous editions have contained, and is certainly one of the most practical works for the ordinary physician who is forced to treat diseases of the skin. In the beginning of the description of each disease is the derivation of its ordinary name, its synonymes, and the frequency with which it occurs. A peculiar advantage of the book is, it seems to us, the clear descriptions of the treatment which is to be instituted. In many instances standard prescriptions are given, while in other cases suggestions as to the combinations of remedies are so practical that the physician has no difficulty in applying the remedy needed in an individual case. The illustrations for a book of its kind are unusually copious, and in many instances are taken from the writer's own practice and not copied from other authors, as is so often the case. References are given with sufficient frequency to enable the special student of dermatology to carry on his researches in dermatological literature as far as he desires, yet are not so frequent as to spoil the appearance of the pages, or to injure the continuity of the text.

It is not surprising that Dr. Hyde's book has reached its third edition in ten years, for, although it deals entirely with a specialty, it is just the work for both the specialist and the general practitioner. A valuable portion of the book is the recognition by the author of the most recent bacteriological researches in connection with skin-disease, as, for example, the recognition of the streptococcus pyogenes as the streptococcus of erysipelas.